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DIALYZED IRON.

By G. H. Charles Klie.

Read at the Meeting of the Alumni Association St. Louis College of Pharmacy, Nov. 19.

Having prepared dialyzed iron several times with but indifferent success when it first came into use in this locality, I was induced to experiment in order to overcome the defects, not so much of the iron solutions employed, but principally those of the apparatus.

The dialisator in these first trials had been constructed by tying thick, well-soaked parchment paper securely over the wider part of a conical glass vessel. The lower intact portion of a broken one-half gallon percolator was used. (To prepare such an one for use, if it is not done by the regular method, a very convenient and expeditious substitute is to tie a string, soaked in spirit of turpentine, in an even line, a little beyond the damaged portion, around the percolator; light the string, and, while burning, turn the percolator diligently that all parts of the circle may be evenly heated, and finally plunge it into cold water; according to the dexterity exhibited in manipulating, the resulting edge will be more or less even.) The dimensions were: Narrow part, 3 inches, and wide part 4½ diameter; total height, including funnel-shaped projection, 8 inches; capacity, about 1 pint.

The solution of chloride of iron used in all of the following processes was of the strength as our Pharmacopœia directs, viz.: 2 fluidrachms of the solution, diluted with water, and treated with ammonia in excess, yield a precipitate which, if washed, dried and ignited, will weigh 28·25 grains; the water of ammonia used had the spec. grav. ·960.

To 4 fluidounces of solution of chloride of iron, 4 fluidounces of water of ammonia were added. After the liquid turned clear, it was put in the dialisator, as above described, and this was placed on two glass rods in an evaporating dish in such a manner that about an inch of space was left between the septum and the bottom of the dish.

Distilled water was then poured in until it reached within 1½ inch of

the top of the dish; the orifice of the percolator was closed with a cork; the distilled water was frequently replenished (at first every two, and afterwards every three or four days). In forty days dialysis was completed, the resulting solution of iron showing no acid reaction, and having a bland taste. It measured 13 fluidounces, and contained 3·25 per cent. of solid matter. When, by spontaneous evaporation, the solution had been concentrated to 9¾ fluidounces, it was found to contain 5 per cent. of solid matter.

When it is taken into consideration that, with the above-described apparatus, two months were necessary to prepare 9¾ fluidounces of solution of dialyzed iron, it will not at all be surprising if it was concluded that in the first place the process was exceedingly tedious; and secondly, it would be more profitable to purchase the preparation if no better apparatus could be constructed. The construction of a somewhat improved dialisator occupied my attention for some time, and fully understanding the defects of the old one, after some few trials, an improved one suggested itself. But, at the same time, other matters relating to dialysis, which were not well understood and needed some investigation, suggested themselves. All, put in the form of questions, are as follows:

1. Which is the most suitable apparatus for preparing the solution of dialyzed iron on the small scale?

2. What solution of iron is preferable for dialysis?

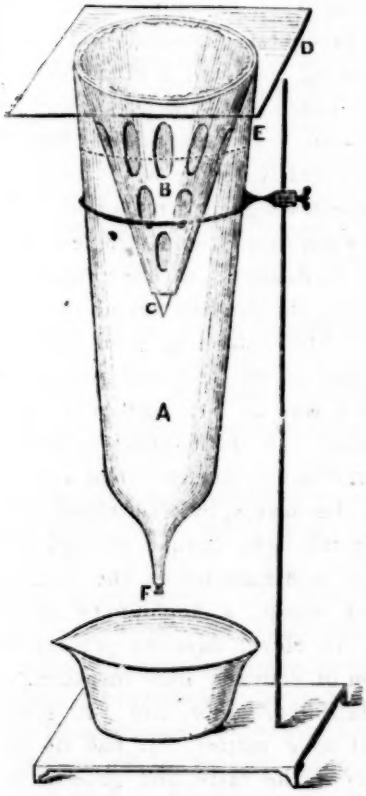
3. What kind of parchment paper ought to be used for a good dialisator?

4. Does the use of distilled or rain water assure a better and medicinally purer preparation than that of common well or hard water in dialysis?

In answering the first question, it will not be maintained by the writer that the apparatus described further on is the possibly best that could be devised, but that up to the present writing it has proved to be very satisfactory in his hands. It is maintained by some that to succeed with dialysis the liquid in the dialisator ought not to reach beyond about a half inch in depth. This assumption is refuted by the working of this apparatus, since in it the liquid may have a depth of from four to six inches, and probably more, without perceptibly retarding the process.

The apparatus is as follows: A half-gallon glass percolator, 3½ inches base and 5½ inches inside diameter at the top, with a 3-inch funnel-shaped projection and a quarter inch orifice, was taken. In this was

adjusted a porcelain filtering basket, 6½ inches high and 5½ inches exterior diameter at the top. It will be noticed that this exactly fits the percolator, the top edges of both vessels standing on a level. The parchment paper, previously well soaked in water, is folded at an angle of 60°, and is then placed in the basket, to which it will fit pretty well and without forming large creases. A filtering basket of smaller dimensions may be used, with the slight disadvantage that it is more difficult to remove from the percolator; and to replenish the water a funnel with an extra long neck must be used. A wire filtering basket of proper dimensions also can be used; but a serious defect is, that it is in a comparatively short time corroded by the acid solution dialyzed from the iron solution. To more easily understand the construction of the dialisator under consideration, the accompanying diagram is given.



APPARATUS FOR DIALYSIS.
One-sixth natural size.

As is seen in the illustration, the apparatus proper is adjusted on a common filtering stand, but it may be adjusted by any other convenient method. When it is necessary to replenish the water the cork is withdrawn, and the liquid allowed to flow into a vessel placed underneath. When dropping from the septum has ceased, which generally takes several minutes, because the water penetrates the folds, the cork is replaced and fresh water is poured in from the top. This is easily done by pushing the septum aside sufficiently to put the neck of a funnel through one of the large openings of the filtering basket.

A, percolator. B, porcelain filtering basket. C, portion of septum projecting from basket. D, glass lid to prevent evaporation. E, water line. F, orifice of percolator closed by a cork.

The capacity of this apparatus is one pint and a quarter. One principal point in its favor is, there being quite a column of water below the dialisator, ample room is afforded to the saturated saline solution, which is dialyzed from the iron solution, to settle to the bottom, and thereby allow fresh portions of water to continually come in contact with the septum, consequently facilitating dialysis considerably.

Having sufficiently described the apparatus, the second question can now be considered, viz., What iron solution is preferable for dialysis? Two solutions only were experimented with. The first was made by dissolving freshly precipitated oxide of iron in solution of chloride of iron to saturation; the second by adding water of ammonia to solution of chloride of iron so long as the precipitate is re-dissolved. The first solution was prepared in the following manner: 4 fluidounces of solution of tersulphate of iron were added to sufficient water of ammonia to precipitate all the oxide of iron. The magma was washed and subjected to powerful pressure until nearly all the water had been expelled, and a hard cake was left, which weighed 2 troyounces and 54 grains. This was crushed in a porcelain mortar, and sufficient solution of chloride of iron was added (3 fluidounces) to effect solution. It was accomplished in about three hours, the product having the consistence of a thick transparent jelly. After standing over night a change had taken place; the transparency of the jelly had given place to a dull liver color. The appearance was as if a portion of oxide had separated and was held in suspension. In reality this was not the case, as no precipitation occurred upon dilution, neither could any precipitate be separated by filtration. In thin layers, by transmitted light, the jelly was transparent, but by reflected light opaque or dull liver colored. Diluted with distilled water to 8 fluidounces, the resulting solution had the consistence of thick syrup; 4 fluidounces of this solution was placed in the dialisator. In eleven days the process was completed, and the resulting solution of dialyzed iron measured 15 fluidounces. It still retained the dull liver color, and 100 grains, evaporated to dryness, left 5 grains of solid matter. It had no perceptible odor, exhibited no astringency to the taste, and gave no acid reaction, but after one month's keeping it had gelatinized, and because thorough resolution, by the addition of distilled water and diligent stirring, could not be effected; it had to be thrown away. The remaining 4 fluidounces of syrupy iron solution, after standing a short time,

separated into two portions, an upper transparent solution and a lower one of precipitated oxide or oxychloride of iron, which latter had a very light-brown color.

Again, the precipitate from 3 fluidounces of solution of tersulphate of iron was slightly washed and dissolved in 1¾ fluidounce solution of chloride of iron. In about six hours the solution was clear, and of a rich dark brownish-red color. It measured 8 fluidounces. This was immediately placed in the apparatus, and dialysis was completed in 11 days. The solution of dialyzed iron measured 19½ fluidounces, was of a clear dark brownish-red color, without odor, and contained 5 per cent. of solid matter. This did not spoil with keeping.

A solution of moist magma of oxide of iron in solution of chloride of iron, which is not of a syrupy consistence, if kept for any length of time, undergoes the same change as the jelly described above. In the first place, the dull, by reflected light opaque color is noticed in the solution, and finally precipitation takes place, leaving it utterly useless for dialysis.

As an experiment a solution, similar to the one used in the defective apparatus, which did not contain the maximum quantity of water of ammonia, was subjected to dialysis. 4 fluidounces of water of ammonia were added to 4 fluidounces of solution of chloride of iron. When the liquid had become clear, it was put in the dialisator. In 11 days dialysis was completed. The solution measured 18 fluidounces, was of a reddish-brown color and contained 5 per cent. of solid matter. During the evaporation of small quantities of this solution, transparent longitudinal scales formed on the margin of the liquid, and if the evaporating dish was left undisturbed, they gradually grew in length towards the centre of the dish, the ends at the same time curling towards the centre. This phenomenon was not noticed in solutions of dialyzed iron prepared from solutions of iron in which either a magma of oxide of iron or water of ammonia in sufficient quantity had been added. These when evaporated apparently coagulated, and when not disturbed the solid matter was found in small brittle heaps, with smaller or larger free spaces intervening, but without the least sign of any scaly formation. This peculiarity might be used as a test to ascertain whether iron solutions employed in dialysis had been sufficiently saturated.

A solution was next subjected to the process to which water of

ammonia had been added to a point that further addition would have left an undissolved precipitate. To 3 fluidounces of solution of chloride of iron 6 fluidounces of water of ammonia was added at once. The mixture at first formed a thick magma, but with diligent stirring, the temperature at the same time rising to 116° Fahr., turned clear in about twenty minutes. It was dialyzed in 11 days. The product measured 16½ fluidounces; it was of a deeper red color than the former, formed no scales upon evaporation, and contained 5 per cent. of solid matter. A solution of iron from solution of chloride of iron and water of ammonia, prepared in the same manner as the last, was placed aside for several days. It remained clear, and not a trace of precipitate could be discerned.

After using the iron solution prepared as above stated a great many times, and always with the same satisfactory result, it was concluded that for this reason, and because it is made in a shorter time, and keeps better than the second, it is preferable for dialysis.

As already stated, the different solutions of dialyzed iron made by the improved apparatus contained 5 per cent. of solid matter. Solution of nitrate of silver produced no precipitate with the diluted solutions. But when they were first precipitated with ammonia, and the filtrate acidulated with nitric acid, and nitrate of silver was now added, turbidity resulted, showing the presence of hydrochloric acid.

What kind of parchment paper ought to be used in the process of dialysis? Other things being equal, certainly the kind with which the process is finished in the shortest time. In the foregoing processes a paper measuring 248 square inches to 1 ounce avoirdupois was used. With it, as will be remembered, dialysis was always finished in 11 days. Latterly, a thinner paper, measuring 560 square inches to 1 ounce avoirdupois, has been used, with the result of shortening the process considerably. With it dialysis was completed in 5 days. It may here be stated that the thick parchment paper was used when the temperature of the atmosphere ranged between 70° and 95° Fahr. and the thin paper at between 40° and 70°.

One phenomenon connected with dialysis by the apparatus deserves some attention. It is, the vessel holding the water being transparent the process can be conveniently observed, and when the charged apparatus is placed against the light, if the heavy parchment paper is used a small band of saline solution (the crystalloid of the iron solution) will be seen

descending from the point of the septum to the bottom of the percolator. This lasts several days. If thin paper is used, this band will assume a considerably larger diameter and descend faster, showing that the crystalloid is separated more copiously than before. Another point which deserves some attention is that from the outset the iron solution in the dialisator increases in bulk to an almost definite quantity. If evaporation has been prohibited by placing a lid on the apparatus, the resulting product will have increased from 9 fluidounces to between 16 and 17 fluidounces, and always contain 5 per cent. of solid matter. This is certainly very convenient, because it does away with the extra work of diluting a too concentrated, or concentrating a too dilute product, especially the latter, if conducted by spontaneous evaporation, being a most tedious process.

Does the use of distilled or rain water, in dialysis, assure a better and medicinally purer preparation than that of common well or hard water? No. Well water has been used, except in the first, in most all the processes described. As is well known, if common hard water is mixed with dialyzed iron, precipitation ensues; consequently, if the iron solution were contaminated by hard water during dialysis, precipitation ought to take place.

This it does not. The water used was taken from a well blown into the rock, principally composed of carbonate of calcium. When oxalate of ammonium is added to the water a copious precipitate results. When the dialyzed iron is first precipitated by ammonia, and oxalic acid is added to the filtrate, no precipitate occurs. From this it is apparent that although common well water cannot be used for the purpose of diluting solution of dialyzed iron, it can be used in dialysis.

To recapitulate: if an apparatus is employed, arranged in such a manner that fresh portions of water continually come in contact with the septum; if the iron solution can be made in a short time; if parchment paper of the proper thickness is used; if evaporation is dispensed with, and if proper care is taken that the product does not become too dilute, a 5 per cent. solution of dialyzed iron measuring 1 pint may be prepared in 5 days.

Lowell, N. St. Louis, Mo, Nov., 1878.

OLEIC ACID AND THE OLEATES.

By L. Wolff.

Read at the Pharmaceutical Meeting, December 17.

Since the reading and publication of my article on the use of benzin in pharmacy ("Amer. Journ. Pharm.," Jan., 1877), in which I pointed out the important utility of the latter substance for the manufacture of oleic acid, I have still further continued my experiments in that direction, and submit some of the results below.

The fact that the purified oleic acid now offered in the market by some of even the most reliable manufacturers is merely the crude acid as derived in the manufacture of candles, deprived of its coloring matter by means of charcoal, and consists to a large extent of stearic acid, has led to much disappointment in the preparation of the so-called oleates. If the crude acid were saponified with lead oxide, and the lead stearate separated therefrom by benzin or ether, as I had originally suggested, many disadvantages might be obviated, and an acid obtained that would answer sufficiently for all pharmaceutical purposes; but that stearic or palmitic acid must prove objectionable for preparing oleates is quite evident.

The separation of the lead oleate from the lead stearate is so difficult when stearic or palmitic acid is present to any extent, that I was soon led to abandon the crude oleic acid and the cheaper oils, such as lard oil or even olive oil, as a source for the acid, and have as yet found none better, more economical or practicable in this process than the oil of sweet almonds. I have also abandoned the primary saponification with a caustic alkali, and have at once saponified the oil of sweet almonds with the lead oxide in the manner as directed by the Pharmacopœia process for lead plaster, employing one-half the quantity more of litharge to ensure the complete saponification of the oil. The plaster—or better the oleo-palmitate of lead—so obtained is readily soluble in benzin, and deposits from this solution the lead palmitate, leaving the lead oleate to be decanted. This benzin solution of lead oleate, shaken repeatedly with diluted hydrochloric acid (1 to 7), separates the lead chloride and leaves a benzin solution of oleic acid, which, after expulsion of the benzin, yields an acid that gives oleates, remaining liquid and clear, and showing a marked distinction from the preparations with the commercial acids, which, even when containing only

ten per cent. of mercuric oxide, renders the preparation a semi-solid, turbid mass, separating finally into two distinct layers of mercuric stearate and oleate.

I have found the following requirements necessary for oleic acid intended for therapeutical application. It should be of a light yellow color, readily miscible with alcohol of 92 per cent., in all proportions, without causing turbidity; should, when treated with a solution of ammonium hydrosulphate, give no dark precipitate, and should not, on exposure to the freezing temperature of water, congeal or grow turbid.

When oleic acid and the oleates were first introduced, many were the expectations, on theoretical grounds, of their efficiency in the treatment of disease, but few as yet have been realized, no doubt owing to the inferior articles employed. That oleic acid and the oleates are destined to take a most important part in pharmacy, though not yet fulfilled, is rapidly coming true.

The oleates of mercury are already in daily use, and will make constant progress when once their efficacy is well known to the medical profession; that, however, to this end we must furnish true oleates, and not oleo-stearates, is at once obvious.

At my suggestion, some ophthalmic physicians of this city have experimented with the mercuric oleate as a substitute for the unguentum hydrargyri oxidi flavi in diseases of the eye, and the result has so far surpassed their expectations that many of them, both in their private practice as well as hospital clinics, have adopted it entirely, instead of the old ointment of yellow mercuric oxide, as it furnishes at once an article that will not decompose, and is more effective and less irritant. As the oleate is more active than the ointment holding the mercuric preparation in suspension, but small quantities of it need be used, and the following formulæ are employed with success:

℞ Hydrargyri oleatis, 10 per cent., . . one part.
Unguenti petrolei, . . . two parts.

M. It corresponds to an ointment containing two grains of the oxide to each drachm.

℞ Hydrargyri oleatis, 10 per cent., . . one part
Unguenti petrolei, . . . five parts.

Containing one grain to each drachm.

I would add that when in the above preparations the commercial acid

was used, the efficiency was impaired, and the preparation increased proportionately in irritant properties.

The oleates of zinc, bismuth and iron were also prepared, of which, however, only the former has of late come into extensive use and demand, and I subjoin my method of preparing an ointment which has been largely employed and met with decided success in the treatment of eczema and lupus, at the hands of dermatologists.

℞	Oxide of zinc,	ʒi
	Oleic acid,	ʒi
	Liquid cosmolin,	ʒi

Dissolve the zinc oxide at a moderate heat in the oleic acid, and then add the cosmolin.

It will be seen that the zinc oxide is contained therein in but small quantities, in comparison to the officinal zinc ointment, but as the action of the oleates—being solutions which are readily absorbed by the skin—is so much more potent, the effect is even more decided and satisfactory.

The oleate of bismuth is similarly prepared, and the oleate of iron is readily obtained by dissolving the ferric oxide in oleic acid, or, where a ferrous oleate is desired, by treating iron by hydrogen with oleic acid in presence of water, yielding in this way preparations which are doubtless destined to prove of value in therapeutics, but of which I cannot as yet report any application.

The oleates of the alkaloids are certainly intended to crowd many of our unsightly and often worthless ointments out of existence, by giving definite means for dermic medication, and already is the oleate of atropia used conjointly with the above-mentioned eye-salve of mercuric oleate.

The property of oleic acid to dissolve the oxides and alkaloids, whereas it has no irritant or corrosive action on organic tissue, has suggested to me the practicability of the use of the oleates for hypodermic injections, forming thereby a medicine which the physician has been much in quest of; and recent experiments in that direction seem to establish their absorption in this way, although this subject needs still further experimentation and observation.

In conclusion, I would speak of one very important application of oleic acid, which will certainly give it the eminent position in pharmacy pointed out above. It is its utility for the separation of the

alkaloids from their crude vehicles. By its affinity for the alkaloids and its inability to take up extractive matter, I have found it most useful to recover such, which are obtained in but an imperfect manner by chloroform or ether, and in recent experiments with pilocarpia have achieved most excellent results. My method of procedure was as follows: The acid percolate from the leaves, deprived of its resin, is treated with a solution of caustic potassa or soda to saturation, causing a precipitate of the impure alkaloid, while the potassium or sodium chloride remains in solution. The precipitate is filtered off, washed and dried, and then treated with oleic acid, which readily takes up the pure alkaloid, rejecting the extractive matter. The oleic acid solution is then diluted with benzin, in which the alkaloid oleate is soluble; the filtered mixture, shaken with water slightly acidulated with hydrochloric acid, decomposes the soap so formed, and takes up the alkaloid, which is again precipitated from it by ammonia, and can then be neutralized with the acid desirable for its salt, and crystallized.

As yet these experiments are but in their infancy; but, theoretically, I see no reason why this process should not be applicable to other alkaloids which are obtained by expensive processes, whereas the cost in my process just mentioned would be a merely nominal one, as the same oleic acid could be again utilized in subsequent operations without impairing its efficiency.

Philadelphia, December, 1878.

ON THE PREPARATION OF SALTS OF BERBERINA.

By J. U. Lloyd, Cincinnati, O.

Read at the twenty-sixth annual meeting of the American Pharmaceutical Association, at Atlanta, Ga., and communicated by the Author.

How can the salts of Berberina be most easily prepared from the root of Hydrastis canadensis? What will be the practical yield and what are the solubilities of the different salts?

Of the many processes investigated, I suggest the following as applicable to small amounts. Owing to the slight yield of this yellow alkaloid, it is hardly advisable for experimenters to work lots of less than ten pounds of hydrastis.

Moisten sixteen troyounces of Hydrastis canadensis in fine powder with eight fluidounces of alcohol, press firmly into a cylindrical perco-

lator not exceeding three inches in diameter, previously prepared for percolation. Cover the surface of the powder with a piece of blotting paper held in position with a few fragments of glass, add alcohol until the percolate appears at the exit, then close the orifice, cover the top of the percolator tightly by tying over it a sheet of soft rubber, and place the percolator in a warm situation; macerate twenty-four hours. Remove the rubber and replace with a cover of glass or tin. Cautiously open the exit and graduate the dropping so that the passage of each fluidounce will occupy about thirty minutes. Suspend the operation when five fluidounces have been obtained. Macerate until the next day under the former conditions, and again procure five fluidounces of percolate, observing the preceding directions. A continuous supply of alcohol must be provided, the surface of the powder must not become exposed during the operation. Mix the percolates, surround the vessel with ice and reduce the temperature, then add sulphuric acid in excess and stir well, keep the mixture cold for twelve or more hours, then pour it upon a muslin strainer or a filtering paper, and when the liquid ceases to pass, return the precipitate to a vessel containing eight fluidounces of cold alcohol. Mix well together and again separate the crystalline precipitate of impure sulphate of berberina. Dry by exposure to the atmosphere.

Sulphate of Berberina.—Add one part of impure sulphate of berberina, obtained as above, to sixteen parts of cold distilled water, and cautiously drop in, with constant stirring, ammonia water until in slight excess. Allow the mixture to stand in a cool place from twelve to twenty-four hours, then filter and surround the vessel containing the filtrate with ice, and stir sulphuric acid into the solution until the ammonia and alkaloid are saturated. In a few hours the magma of minute crystals of sulphate of berberina can be separated with a muslin strainer or filtering paper. Care must be taken to avoid an excess of sulphuric acid. If this occur, the moist magma should be removed to a vessel containing cold alcohol, washed by decantation and drained on a muslin strainer. Lastly, dry the salt by exposure to the atmosphere.

Sulphate of berberina is of an orange color, soluble in about 100 parts of water, tem. 60° to 80°F. It is readily decomposed by alkalies when in solution, yielding free berberina.

I obtain from eighteen to twenty-one ounces from a hundred pounds of hydrastis. The specimens of salts exhibited represent the sulphate

of berberina from a fifteen hundred pound batch of root. This batch yielded very nearly three hundred ounces. Although the exhaustion was incomplete, with economy I could not carry the percolation farther.

Sulphate of berberina is permanent, exposure to the atmosphere does not affect it. If moisture be absorbed, either the salt is impure from hygroscopic extractive matter or free sulphuric acid.

Berberina.—Rub eight parts sulphate of berberina in a wedgwood mortar, cautiously adding ammonia water until in slight excess. Pour the dark liquid into thirty two parts of boiling alcohol and allow the mixture to stand thirty minutes, then filter. Stir into the filtrate thirty-two parts cold sulphuric ether and cover tightly. Surround the vessel with ice and allow it to stand from twelve to twenty-four hours, then separate the magma of minute crystals of berberina with a muslin strainer or filtering paper, and dry by exposure to the atmosphere.

Berberina is lemon-yellow when pure. It should not be dark or orange, which shades denote impurity. It unites directly with acids and is a beautiful organic base. It forms salts, some of which are very soluble, as for example the pyro-phosphate, others almost insoluble. I find it impossible to make one part of carbazotate of berberina dissolve in forty-five thousand parts of cold distilled water. Berberina and all its soluble salts are bitter. The carbazotate will not impart a trace of bitterness to distilled water, notwithstanding its constituents are both intensely bitter, therefore I believe it to be almost if not absolutely insoluble.

Berberina is soluble in about four and a half parts of water, temperature 60° to 80°F. It dissolves moderately in officinal alcohol, is insoluble in ether and chloroform. It changes to orange color when heated to 150°F., and slowly resumes its original shade when cooled.

Phosphate of Berberina.—Dissolve berberina in its weight of boiling water and add two parts of dilute phosphoric acid, drain and dry the precipitate by exposure to the atmosphere. Care must be taken that the acid be made from phosphorus and perfectly free from nitric acid.

The ortho-phosphate is, according to Mr. Lord, soluble in two hundred and eighty parts of water.

Hypophosphite of Berberina.—This salt may be prepared by substituting in the above formula hypophosphorous acid for phosphoric.

Hypophosphite of berberina is soluble to the extent of from five to ten grains in the ounce of water.

Muriate of Berberina.—Dissolve berberina in sixteen times its weight of distilled water, and cautiously stir in hydrochloric acid until in slight excess; drain the precipitate, and dry by exposure to the atmosphere.

Muriate of berberina was the first preparation of this alkaloid introduced to the medical profession from hydrastis. It was discovered accidentally. It is soluble in about five hundred parts of water, 60° to 80°F., scarcely soluble at all in cold alcohol, ether and chloroform. It is the most difficult of the berberina salts to decompose, holding its acid in presence of alkalies, and even long digestion with litharge fails to thoroughly remove it. Oxide of silver at once frees the berberina from a heated solution. When dry it is changed from the natural light lemon color to orange by a heat from 130° to 150°F. Upon cooling, the lemon color is resumed. It is rapidly falling into disuse, giving place to the more soluble salts.

Nitrate of Berberina.—This salt can be obtained by substituting nitric acid for the muriatic acid of the preceding formula. It is of a greenish-yellow color, soluble in about five hundred parts of water, temperature 60° to 80°F.; more soluble in hot water, scarcely soluble in alcohol, ether or chloroform. Its use is limited.

Remarks.—Alcohol extracts from hydrastis canadensis, in addition to berberina, a greenish fixed oil, an acrid resin, a white alkaloid, a vegetable acid, yellow coloring matter, and small amounts of other substances of little interest here. The materials named are intimately associated or combined while in the root; such combinations being broken up by the addition of the acid, resulting, simply perhaps, in the formation of sulphate of the white alkaloid *hydrastia*, sulphate of the yellow alkaloid *berberina*, and the liberation of the resinous substances, coloring matter and acid.

The yellow sulphate of berberina quickly crystallizes, carrying down some of the other materials; the larger amount of the latter, however, remain in solution. This impure sulphate of berberina is difficult to dry, even if well washed; the reason being the mechanical admixture of the oil alluded to; consequently at this stage it has a greenish cast and imparts an unctuous feeling when rubbed between the fingers.

Sulphate of berberina is decomposed by alkalies, with the liberation

of the alkaloid berberina. When we add ammonia water in slight excess to a mixture of the impure sulphate of berberina and water, sulphate of ammonia is formed, which dissolves, together with the liberated berberina, an alkaloid very soluble in water and alkaline solutions. The slight excess of ammonia precipitates the hydrastia in an amorphous state, which, with the adhering resin and oil, are separated by filtration; afterward, sulphuric acid added to the filtrate again forms sulphate of berberina, which crystallizes. This is pure enough for all practical purposes. It contains a small amount of sulphate of ammonia and a little foreign matter. It can be purified farther, if desirable, by repeating the last operation, dissolving in hot alcohol and crystallizing. For practical purposes this is unnecessary.

When ammonia water is added to sulphate of berberina, the salt is decomposed, with formation of sulphate of ammonium and the liberation of berberina. Both substances remain in solution, the berberina imparting a dark red color. The addition of the hot alcohol precipitates the larger portion of the sulphate of ammonium, and when the filtrate containing the berberina is poured into sulphuric ether, that alkaloid crystallizes in consequence of its slight solubility in ether and a mixture of alcohol and ether. The impurities may be traces of sulphate of ammonium.

The other salts, simply combinations of berberina and the acids, do not require mention. Almost any salt may be produced in like manner by the substitution of various acids.

I have met with little success in endeavoring to obtain berberina by evaporation of a solution of the alkaloid, unless by spontaneous evaporation, the heat of expanded steam, 150° to 180° Fahr., seeming to decompose it.

Fixed Oil of Hydrastis.—After separating the sulphate of berberina from the tincture, add to the liquid its bulk of water and evaporate the alcohol. Allow the residuum to remain in a cool place some days, and carefully skim off the green oil which collects on the surface of the water associated with a little resin. It can be purified by dissolving in sulphuric ether.

This oil has a disagreeable odor and taste, but is not bitter. It turns reddish-brown by age.

Volatile Oil of Hydrastis.—In addition hydrastis contains a very small amount of volatile oil, which imparts the peculiar odor of the root. It

may be procured in minute quantities by distilling water in contact with the root.

Resinous Substances.—Decant the aqueous solution from which the oil was separated, and at the bottom of the vessel will be found a black tarry substance, thickly interspersed with yellow particles. Usually a yellow shining layer covers the top. This consists of resin, a little oil, and mixtures of both the white and yellow alkaloids with the resin and yellow coloring matter. Perhaps a combination exists between this substance and the alkaloids which settle with it. It is difficult to separate them by simply washing in hot water, which should scarcely be the case if they are dissociated, inasmuch as the sulphates of both alkaloids are quite soluble in this menstruum. Wash the precipitate well, and dry. This black resinous substance is acrid to the taste, slightly soluble in hot water and dilute acids, soluble in concentrated sulphuric acid, to which it imparts a deep red color, and from which it is separated by the addition of water. It may be a mixture of several proximate principles.

In some respects this substance reminds us of the amorphous material obtained from cinchona known as chinoidin, and it may, perhaps, be largely composed of a principle from hydrastis, bearing a somewhat similar relation to hydrastia that chinoidin bears to the crystallizable alkaloids of the cinchonas.

Hydrastia.—This white or yellowish-white alkaloid exists as sulphate in the liquid decanted from the last-named preparation. It is associated with small amounts of all the preceding substances and a soluble vegetable acid. To obtain it add an alkali, preferably ammonia water, in excess to the cold liquid, and allow the brown or brownish-yellow precipitate to settle; then decant the supernatant liquid and wash the precipitate with cold water. Add cold water enough to the drained precipitate to bring to the original volume, and then slight excess of sulphuric acid. Allow it to stand in a cold place twenty-four hours and filter. To the filtrate add an alkali in excess, and wash the precipitate as before. Dry the precipitate, dissolve in boiling alcohol, filter and crystallize. These crystals are of a deep dark yellow color. They are not bitter, but impart a disagreeable acrid sensation to the throat and fauces. The yellow color results from the intimate admixture of a yellow substance, very soluble

in acid solutions and imperfectly in neutral and alkaline. It is not berberina.

Purify hydrastia by dissolving in a dilute acid, digesting with animal charcoal and filtering, repeating the operation several times. Or dissolve the crystals of impure hydrastia in boiling alcohol and crystallize, repeating the operation several times. Specimens of small hydrastia crystals, apparently white, are found to be yellow when crystallized in large masses. It is very difficult to obtain an article free from yellowness if the crystals be large. I have none.

Hydrastia is insoluble or nearly insoluble in water, freely soluble in cold chloroform, and to an extent in cold alcohol, very soluble in boiling alcohol, from which it separates in beautiful crystals. It forms salts with acids, mostly very soluble in water, uncrystallizable or crystallizing with difficulty.

These incidental products are of little general interest to manufacturers, as only berberina salts are in demand.

I have already digressed from the direct line of my query. I will close by saying that there is a doubt in my mind as to the relations of these several principles while associated in the plant. I cannot believe they are as simple as we might expect and is generally believed. I doubt even if berberina and hydrastia are not mutually combined with other bodies. The splitting up of these organic compounds under the influence of chemical agents, drying the plants, and the action of solvents, is with me very obscure.

SULPHUR MINING ON THE PACIFIC COAST.

By Rich. V. Mattison, Ph.G.

Read at the Alumni Meeting, Philadelphia College of Pharmacy, December 4.

Among the variety of mineral productions of the Pacific Coast, the mining, the various processes for the reduction of ores, the curious formations of the metalliferous lodes, etc., there are few subjects of more interest to the Eastern pharmacist or chemist than the production of sulphur. Through Nevada and Montana Territories, sulphur deposits are found in numerous places, and the element quarried out in masses of considerable size and of remarkable purity, as the sample exhibited, marked No. 1, will show, this particular sample being from the mines near Humboldt, Nevada, where the sulphur exists in veins among the

quartz. The greater part, however, of the sulphur produced on the coast requires to be purified before it can be utilized for either pharmacy, agriculture or the arts. For illustration I shall select two impure forms in which it occurs, as the typical crude material from which the sulphur is extracted. A sample of the first is upon the table, labeled No. 2, and is from the Pluton Mines, in Pluton Cañon, Cal.

This mine is situated near the foot of the mountain, which rises rather precipitously from the bottom of the cañon, and is evidently the remains of an extinct "geyser." The ground in the immediate vicinity is cinnabar bearing, and the breasts of the mine are worked directly into the reddish-gray, semi fused, ashy mass, consisting largely of minute sulphur crystals, interspersed with magnesium and calcium oxides and hydrates, the whole deriving its color from the ferric oxide and mercuric sulphide. In many places are fragmentary masses, several pounds in weight, of nearly pure fused sulphur, but the largest part is a gray ashy mass of easily pulverulent sulphur crystals. This yields readily to the pick, and is transferred by cars to the reduction works, there dumped into the "purifier," which—the invention of the efficient superintendent, Mr. Eames—may be described as follows:

The "purifier" is composed of wrought iron, about the thickness of boiler iron, riveted together, and shaped not unlike a percolator. It has a diameter of about four feet and a height of probably eight, and has a capacity of about a ton of charge. The bottom is perforated and funnel-shaped, while the top is covered by a wrought-iron lid with bolt attachments. The charge of crude sulphur having been properly dried, is dumped into the purifier, a double thickness of heavy gunny cloth having first been carefully spread over the perforated bottom of the cylinder. The lid being securely attached, superheated steam is turned into the purifier through a tube in the side of the cylinder, and the sulphur, gradually melting, settles to the bottom, where it is drawn off by means of a stop-cock, either into moulds or boxes. The greater part is run into wooden moulds, a specimen of which is shown. The specimen, unique in its way, accompanying the moulded portion, has been run into water, this accounting for its peculiar shape. As the whole apparatus swings upon a pivot, the work of withdrawing the charge can be effected in a few moments. It may be readily seen that sulphur is here extracted at the lowest cost of working, while the cost of erecting the entire plant is a merely nominal sum.

At Sulphur Banks Mine, near Lakeport, the sulphur occurs with the cinnabar, the whole in the form of a dark-gray ash, entirely free from rock or sulphur crystals. The sulphur is procured by following the process above given as at Pluton, or by the dry process, which is as follows:

The mixture containing both sulphur and cinnabar in paying quantities, and being worked for both, is placed in the usual cinnabar reduction furnace, and the mercurial vapor, in common with the sulphur, passed into the first receiver, where, under the influence of superheated steam, the sulphur is liquefied, the mercury passing to the second receiver and there condensed.

Formerly some sulphur was prepared by sublimation, the product being collected in powder, and then cast into rolls or placed on the market as collected, but we believe none at present is so prepared by any of the manufacturers on the coast.

Philadelphia, Twelfth month 4th, 1878.

FRUIT SYRUPS.

By Hermann Tiarks.

In comparing the Pharmacopœia of the United States with the "Pharmacopœia Germanica," it strikes me that our Pharmacopœia is remarkably void of formulas for fruit syrups. The only fruit syrups, properly so called, in our Pharmacopœia are those of almond and of lemon. The syrup of almond, being demulcent and somewhat sedative, is an excellent addition to cough mixtures, or may be used for flavoring, while as an agreeable and refrigerant addition to drinks, etc., we have a choice only between the syrup of citric acid and the syrup of lemon, which latter is very unstable, as every pharmacist knows.

I would respectfully call the attention of the members of the medical and pharmaceutical profession to two excellent fruit syrups: the Syrupus Cerasi and Syrupus Rubi Idæi of the German Pharmacopœia. The process for making these syrups is not difficult for one who is at all familiar with pharmaceutical manipulations, and the fruits—cherries and raspberries—are abundant in most every State of the Union. For cherry syrups only the dark red sour cherries should be used, and for raspberry syrups the red berries, as these contain the most juice and have the richest flavor.

The following is the outline of the process of the German Pharmacopœia, with some explanations and suggestions taken from Hager's Commentary:

All fleshy and juicy fruits contain pectin, which substance causes the fresh fruit juices to be slimy and to gelatinize if boiled with sugar and afterwards cooled. When a syrup made of fruit juice contains some of this pectin, it is certain soon to mould and to spoil. Therefore the fruit juices have to be freed first from the pectin before they are made into syrups. The pectin has to be decomposed and this is done by fermentation.

The fruits are first crushed and set aside for three or four days in an earthen jar, the mass being stirred once a day with a wooden spatula. The juice is now pressed out and set aside again for a few days until fermentation is completed and the juice appears clear. In order to detect any undecomposed pectin a little of the juice is mixed with a concentrated solution of magnesium sulphate, when, if any pectin is present, it will congeal or gelatinize, or a flocculent precipitate will separate. The juice, mixed with twice its volume of 90 per cent. alcohol, should form a clear solution.

The juice is then filtered through paper. If to the crushed fruit 2 per cent. of sugar is added fermentation will go on more promptly and the fermented juice will filter more rapidly. In five parts of this filtered juice nine parts of the best white sugar are dissolved by the aid of heat, the temperature is raised to the boiling point, and the solution strained while hot. No iron vessels should be used. The vessel containing the syrups is covered with a large sheet of paper and set aside in a cool place for a day. The syrup is now filtered in perfectly dry bottles of convenient size; the bottles are tightly corked and laid on a shelf in the cellar. The syrups thus prepared will keep well for one or two years. These syrups, and more especially the raspberry syrup, is of a dark ruby-red color; it has a rich flavor and is a most cooling and grateful addition to drinks, beverages in febrile complaints; also to solutions, saturations, etc.

I would respectfully suggest to the Committee on Revision that one or both of these syrups be introduced in our Pharmacopœia at the coming revision.

Monticello, Iowa, Dec. 2, 1878.

GLEANINGS FROM THE GERMAN JOURNALS.

By Louis von Cotzhausen, Ph.G.

Chrysophanic Acid from Senna.—After reviewing the different investigations on chrysophanic acid, E. T. Leussler states that the chrysophanic acid obtained from senna leaves together with emodin, is identical with that found in rhubarb, and that frangulic acid is neither identical with emodin nor with the chrysophanic acid of senna and rhubarb.—*Pharm. Ztschr. f. Russl.*, 1878, p. 257, 289, 321 and 353.

New Process for Removing all Albumen from Animal Liquids.—Hofmeister removes first the greater bulk of albumen in the ordinary manner, precipitating it by cautiously adding acid to the boiling liquid. He then adds hydrate of lead to the filtrate, continues to boil for several minutes, refilters, removes the disssolved lead from the filtrate by sulphuretted hydrogen and the excess of the latter again by boiling, when no trace of albumen can be found in the liquid by the most delicate reagents. If the original solution contains sulphates or phosphates in large quantities, it is advisable to add a few drops of a solution of acetate of lead before boiling with lead hydrate to prevent the retention of a small quantity of albumen in the shape of albuminates.—*Chem. Centralbl.*, Oct. 2, 1878, p. 635.

Volatile Acids of Croton Oil.—After referring to the researches made by Th. Schlippe and Geuther and Froehlich, E. Schmidt and Dr. Berendes confirm the analysis of the latter, who claims that the liquid volatile acids are formic, acetic, butyric, valerianic acid and the higher members of the oleic series, while the solid acid is tiglinic acid, $H_2C_5H_7O_2$, isomeric, but not identical with angelicic acid. The average total yield from one pound of croton oil is about 11 grams of crude acids. Comparative experiments made with tiglinic acid and the methyl-crotonic acid of Frankland and Duppa, prove that they possess the same properties and are probably identical.—*Archiv d. Pharm.*, Sept., 1878, p. 213.

Mineral Constituents of Horseradish.—A. Hilger reports that 100 parts of the ashes of the root of Cochlearia armoracia consist of 10·57 lime, 3·91 magnesia, 0·21 soda, 41·47 potassa, 0·95 oxide of iron, 1·58 hydrochloric acid, 16·49 sulphuric acid, 11·62 carbonic acid, 11·52 phosphoric acid and 1·48 silicic acid.—*Chem. Centralbl.*, Sept. 18, 1878, p. 597, from *Landw. Vers. St.*

Determination of the Alkaloids of Bolivia Cinchona Barks Exhibited at the "International Horticultural Exposition" at Amsterdam, in 1877.—The following table shows the results of comparative analyses of the different barks made by W. Stoeder:

	Percentage of					
	Quinia.	Quinidia.	Cinchonidia.	Cinchonia.	Amorphous alkaloid.	Total alkaloids.
Flat Calisaya bark. Monopoly cinchona of commerce of 1845—1855.	3·110			0·490	0·195	3·795
Flat Calisaya from the province of Yungas.	4·268			0·496	0·164	4·928
Flat Calisaya, covered with periderm, from Yungas.	1·724			0·468	0·172	2·364
Flat Calisaya from Inquisive and Cochabamba.	3 92			0·772	0·272	4·336
Flat Calisaya from Espiritu Santo in Yurucares.				1·288	0·236	1·524
Flat cinchona from Larecuja, Songo and Challaux (known as Cascarilla Naranjada [orange-colored cinchona]).			1·516	2·096	1·088	4·700
Quilled cinchona from naranjada-trees, used to adulterate quilled Calisaya.				2·044	0·632	2·676
Quilled Calisaya from good trees, young stems, branches and shoots.	3·892			0·564	0·144	4·600
Quilled cinchona from young stems and shoots of Caupolican, Pelechuco and Apolobamba.				0·234	0·036	0·270
Quill'd cinchona f'm the branch's of trees gro'n at Inquisivi, used for adulterating better kinds.	0·292			0·005	0·184	0·531
Quilled cinchona from Yungas and Chorobamba.				1·184	0·652	1·836
Flat and rolled cinchona grown in Vallegrande.				2·128	0·408	2·536
False cinchona bark (faux bois), called by the Aymara Indians Car-hua, Car-hua (very bitter).	0·308		0·512	0·760	0·088	1·668

—*Archiv d. Pharm.*, Sept., 1878, p. 243, from *Haarmann's Nieuw Tydschr. v. d. Pharm. in Nederl.*

Solubility of Sulphur and Phosphorus.—After Liebermann had found sulphur soluble in concentrated acetic acid, Dr. G. Vulpius made a series of experiments, which resulted in establishing the solubility of phosphorus in concentrated acetic acid, and also that of minute quantities of sulphur and phosphorus in formic acid (spec. grav. 1·220). At 100°C., 2,800 parts of the latter dissolved 1 part of sulphur, which partly separates again on cooling; phosphorus is still less soluble, the acid scarcely dissolving 0·01 per cent. The author also calls attention to the solubility of sulphur and phosphorus in stearic acid at a high temperature, and considers it probable that both will also be found soluble in propionic, butyric and the other fatty acids.—*Ibid.*, p. 229.

Collodium iodoformiatum is made by dissolving 1 part of iodoform in 15 parts of flexible collodion. It was successfully used by Moleschott for alleviating intense pain caused by gouty swellings, in orchitis, glandular swellings, etc.—*Pharm. Centralh.*, Oct. 3, p. 373.

Copaivic Acid and Copaivate of Soda.—Roquette considers the etherial oil and the balsamic constituents of copaiba inert, and regards its efficacy solely due to the copaivic acid, which forms salts with the alkalies existing in the human body, and is thus excreted through the urine. Dr. Zlamál agrees with him in this opinion after having successfully treated various important cases with copaivate of sodium, prepared at his suggestion by Geza Lucich. For obtaining the copaivic acid, copaiba is distilled with water to separate volatile oil, and the residuary resins are repeatedly treated with purified petroleum and strong alcohol. Copaivic acid forms white prismatic crystals, which, on exposure to the air, become opaque. Its sodium salt, $NaC_{20}H_{29}O_2$, is made by combining equivalent quantities of the acid and soda, and is likewise white and crystalline. Lucich recommends sugar-coated pills of copaivate of soda, containing each 2 grains of the latter, corresponding to 6 grains of balsam copaiva; analyses made by him of Brazil- and Para-balsam proved it to consist of etherial oil 38·00 per cent., yellow crystallizable resin, copaivic acid, 52·75 per cent., brown soft resin 1·66 per cent. and water 7·59 per cent.—*Ibid.*, p. 374.

New Method of Milk Analysis. By A. Adam.—10 cc. of 75 per cent. alcohol, containing 1-200 of its volume of caustic soda; 10 cc. of neutralized milk, and 12 cc. of pure ether are placed into a glass tube of 40 cc. capacity, closed at the top with a cork, widening

towards the centre into a bulb, and tapering towards the lower end, and there supplied with a stop-cock. They are shaken together and allowed to stand for five minutes, when two distinct layers form, the upper one containing all the butter and the lower one all the lactose and casein. After carefully separating them by means of the stop-cock, the butter is obtained by concentration and purified by dissolving in ether and evaporating the latter. After adding sufficient distilled water to make 100 cc. and 10 drops of acetic acid to the lower layer the casein separates, is removed by filtration and the lactose determined in the filtrate by Fehling's solution.—*Chem. Centralbl.*, Oct. 16, 1878, p. 663, from *Compt. Rend.*, vol. 87.

Test for Resin as an Adulteration of Beeswax.—E. Schmidt recommends the following modification of Donath's method, by which 1 per cent. of resin can be easily detected: To 5 grams of the wax, heated with 20 or 25 grams of crude nitric acid, sp. gr. 1·32 to 1·33, to the boiling point, add an equal quantity of cold water and sufficient ammonia, shaking constantly to impart to the mixture an ammoniacal odor, and pour off the alkaline liquid from the separated wax into a cylindrical vessel. If the wax is pure this liquid will have a yellow, if adulterated with resin a decided reddish-brown color, caused by the nitro-products formed.—*Archiv d. Pharm.*, Sept., 1878, p. 212.

Detection of Ergot in Flour by a Simple, Short and Exact Method.—Dr. E. Hoffmann recommends C. H. Wolff's process, with slight alterations, as follows: 10 grams of the suspected rye flour, 15 grams of ether and 10 drops dilute sulphuric acid (1 : 5) are frequently shaken together and allowed to stand for half an hour, when they are placed on a filter and washed with ether until the straw-colored filtrate amounts to 10 grams. If this is shaken with 5 drops of a saturated aqueous solution of sodium bicarbonate the latter will immediately separate again and will settle, possessing scarcely any color in case the rye-flour is strictly pure and contains no ergot, while all chlorophyll will remain in the etherial solution. The presence of 1·10 per cent. of ergot in the flour will cause a handsome violet coloration of the sodium-bicarbonate solution, which then holds all the color of the ergot. By this method the author claims to be able to detect the presence of 1-50 per cent.; he also succeeded in determining by this method the presence of ergot in a mixture of cinnamon, orange-

leaves and ergot, and in a mixture of sausage, bread-crusts, vegetables, brown sauce and ergot.—*Pharm. Ztg.*, 1878, No. 84.

Effect of Ergot on Musk.—E. Biltz states that the odor of musk can be entirely removed from the hands by rubbing with powdered ergot mixed with warm water.—*Pharm. Centralh.*, Oct. 10, p. 389.

Laforest's Lotion Cosmetique.—This nostrum is recommended for dyeing the hair black, and consists of 360 grams of red wine, 4 grams chloride of sodium, 7 grams sulphate of iron and 4 grams oxide of copper, which are heated together for a short time, when 7 grams of powdered nutgalls are added. This mixture is rubbed on the hair, then rubbed off with a warm cloth, and the hair washed with water. —*Ztschr. d. Oest. Ap. Ver.*, Sept. 1, 1878, p. 408.

CONTRIBUTIONS from the PHARMACEUTICAL LABORATORY at TOKIO, JAPAN.

By Dr. G. Martin.

The Seeds of Camellia japonica, which are considered poisonous by the Japanese, were analyzed by Katzujama and found to contain a blueish-white, bitter, slightly crystalline principle, called *Camellin* by the author, which is scarcely soluble in cold water and ether, more so in hot water, very soluble in alcohol, and which, after boiling with dilute sulphuric acid, reduces alkaline copper solutions. It turns yellow on the addition of alkalies, red with a mixture of much H_2SO_4 with a little HNO_3, and greatly resembles digitalin in its behavior towards phosphoric acid; its constitution is $C_{53}H_{84}O_{19}$. The seeds also contain tannic acid and a thick semi-solid fixed oil, possessing an acrid unpleasant taste. It was formerly used for oiling the swords of Japanese soldiers.

Pæonia Moutan.—The root, which is often prescribed by Japanese physicians, was analyzed by Iagi, who obtained by extraction with ether and spontaneous evaporation a crop of shining white aromatic needles, melting at 45°C., sublimable at a higher temperature, insoluble in cold water, very soluble in alcohol and ether, and precipitated from an alcoholic solution in crystals by a large quantity of water. From alcohol it crystallizes on spontaneous evaporation in prisms 5 to 15 mm. in length. An analysis seems to prove this crystalline substance a fatty acid, allied to caprinic acid, but having a higher melting point.

Scopolia japonica, also called Japanese belladonna, belongs to the nat. ord. of Solanaceæ. The root is used by Japanese physicians like belladonna, is, however, inferior in its narcotic action. It contains no atropia but solania, which G. Martin obtained in crystals. A peculiar characteristic of the plant is its extraordinarily great fluorescence.

Evodia glauca, N. O. Rutaceæ.—The bark is light yellow, slightly greenish, covered with a corky layer, very fragile and soft and is readily divided into thin lamellæ. It possesses a strongly bitter taste, and becomes very mucilaginous when chewed. G. Martin obtained from it a considerable quantity of berberina. The bark is used by the natives for medical purposes and for dyeing.

Japanese cinnamon.—The cinnamon examined by G. Martin came from the island of Sikok, and was probably obtained from Cinnamomum Loureiri. The volatile oil obtained from it has a wine-yellow color, is lighter than water and has a very agreeable odor, somewhat recalling that of camphor and cinnamon. Concentrated sulphuric acid imparts to the oil a violet-red color, which changes to indigo-blue, afterwards to beautiful green and finally to brown. With concentrated nitric acid the oil forms a waxy mass, which readily melts to an oily liquid on being warmed. The oil rotates polarized light somewhat to the right; treated with caustic soda it loses its cinnamon odor and the odor of camphor becomes more apparent. A distinct odor of bitter almond is observed on acting upon the oil with an aqueous solution of potassium permanganate.

Ligustrum Ibotu.—The seeds are about 2 mm. long, 1 mm. broad, convex on the back, irregularly grooved, pointed at both ends, and the points united on the inner side by a furrow. G. Martin isolated from the seeds a resinous white glucoside, which is colored red by concentrated H_2SO_4, and for which the author proposes the name *Ibotin*. The seeds also contain sugar and about 20 per cent. of fatty oil, resembling olive-oil and solidifying when cold—caffeina, the presence of which was reported by some investigators, could not be obtained. The ash amounts to 3.422 per cent.—*Archiv d. Pharm.*, Oct. 1878, p. 334–339.

L. v. C.

TANNIN AND BITTER PRINCIPLE OF HOPS.

By C. Etti.

The substance named "lupulo-tannic acid" by the author does *not* precipitate gelatin; if, however, it is dried at 120° to 130°C., it changes from yellowish-white to red, loses water, and when dissolved in very dilute alcohol *precipitates gelatin completely*, just like ordinary tannin.

On heating the yellowish alcoholic solution of the original tannin on the water-bath it becomes red, and on evaporation a dark-red residue remains which also precipitates gelatin when again dissolved in dilute alcohol. The author calls this "phlobaphen."

Analysis gives the same composition for this as for the red compound obtained by heating the lupulo-tannic acid at 120° to 130°, each having the formula $C_{50}H_{46}O_{25}$, and they may be supposed to result from the expulsion of a molecule of water from two molecules of tannic acid of the formula $C_{25}H_{24}O_{13}$.

The coarsely powdered hop flowers are placed in an extraction apparatus, and after being freed from resin and bitter principle as much as possible, the mass is extracted with 20 per cent. alcohol. On evaporating to a small bulk and cooling a red precipitate of phlobaphen is formed; this is dissolved in 90 per cent. alcohol, evaporated to dryness and heated to 120° or 130°. If it tastes bitter, the bitter principle may be removed by ether. Phlobaphen is easily soluble in alkalies, and is precipitated unchanged by dilute mineral acids. On boiling the freshly precipitated and not previously heated phlobaphen with dilute mineral acids it is decomposed, glucose and one molecule of water being split off.

As the phlobaphen is easily prepared, is constant in composition and precipitates gelatin solution completely, it may be estimated quantitatively like tannin and may be used in standardizing the solution employed.

An etherial extract of hop flowers contains, besides an essential oil, chlorophyll, a crystallized white and an amorphous brown resin, to which the bitter principle adheres. After driving off the ether 90 per cent. alcohol dissolves brown resin and the bitter principle, which may be separated from each other by adding water as long as the resin continues to be precipitated. Repeated solution in alcohol and dilution with water frees the resin from the bitter principle. The aqueous solution is evaporated in a vacuum over sulphuric acid, the amorphous

residue dissolved in 90 per cent. alcohol, again evaporated, and so on repeatedly until well-formed, extremely bitter, colorless crystals are obtained. The crystals are completely soluble in water. These expriments oppose the idea that the "bitter resin" of hops can be dissolved in water only with the aid of sugar, tannic acid, gum, etherial oil, etc. The brown amorphous resin and the bitter principle of hops are two fundamentally different substances.—J. T. *Jour. Chem. Soc.*, October, 1878, from *Dingl. polyt. J.*, ccxxvii, 354—357.

THE DISTINCTIVE TESTS FOR CARBOLIC ACID, CRESYLIC ACID AND CREASOTE.

By Alfred H. Allen.

Several previous observers have devised methods of distinguishing carbolic acid from wood-tar creasote, and have described tests which when applied to the pure substances leave little to be desired.

It appears, however, not to have been observed that cresylic acid, so largely present in the commoner kinds of carbolic acid, resembles creasote more closely than pure carbolic acid does, and fails altogether to respond to some of the tests which have been proposed to distinguish carbolic acid from creasote. As the substitution of coal-tar acids for wood-tar creasote is pretty certain to be made by the employment of a crude variety of carbolic acid, the presence in it of cresylic acid cannot rightly be ignored.

With a view to clearing up the discrepancies between the results recorded by other observers, and of ascertaining the most reliable tests for distinguishing carbolic and cresylic acids from wood-tar creasote, I have instituted a series of special experiments.

As the origin of some of the statements made by other observers cannot be traced, owing to imperfect descriptions of the substances on which they worked, I think it well to define carefully the exact substances on which my own experiments were made.

The *Carbolic Acid* was a sample of Calvert's No. 1, for internal use; boiling point 182°C.

The *Cresylic Acid* I prepared by fractional distillation of Calvert's No. 5 carbolic acid. The portion coming over between 125° and 205°C. was collected separately and again distilled, the first and last

portions being rejected. The cresylic acid thus obtained boiled chiefly at about 197°C., but another smaller fraction boiled at 203°C.

I believe this difference is due to the presence of two isomeric cresols in coal-tar, having slightly different boiling points. Many of the experiments were made separately on both fractions, but without the least further difference in their properties becoming apparent. The distillations were conducted in an atmosphere of coal-gas.

The *Creasote* was a sample of Morson's wood-tar creasote. It boiled at 217°C., and so probably consisted chiefly of creasol, as guaiacol boils at 200°C.[1]

It was pointed out by Calvert many years ago that carbolic acid formed a crystalline hydrate, of the composition C_6H_6O, H_2O, which fused at 17°C. This fact is usually ignored by the bookmakers though well known to carbolic acid manufacturers. This hydrate would contain 16·07 per cent. of water. When water is gradually added to carbolic acid with repeated shaking the crystals become liquefied, and at length a portion remains at the surface.

In order to ascertain how much water carbolic would take up, about 13 grams of the crystallized acid were melted and boiled for a minute or two in a small weighed test-tube to drive off traces of water. After cooling the whole was weighed. Cold water was then added gradually with repeated shaking until about ·2 cc. remained as a layer on the surface of the liquefied acid. This was then removed by cautious use of wet blotting paper, and the residual carbolic acid weighed. 9·190 grams were found to have increased to 12·527, which gives 26·6 per cent. as the proportion of water in the liquid acid. On repeating the experiment a liquid acid containing 27·0 per cent. of water was obtained. This fact is of importance as showing that carbolic acid will take up far more water than is commonly supposed. The proportion is also of interest, as it corresponds pretty closely to the formula C_6H_6O, $2H_2O$.[2]

Hence the liquid acid may be regarded as a definite hydrate of phenol, but the fact that warm carbolic acid will take up a larger proportion of water than the above, and that the water is entirely separated by agitation with benzol is against this supposition.

On trying a similar experiment with cresylic acid I found that the

[1] According to some observers, at 210°C.

[2] The theoretical proportion of water in this compound would be 27·69 per cent.

water absorbed amounted to 13 per cent. of the hydrated acid. On repetition the product contained 14 per cent.

C_7H_8O, H_2O requires 12·7 per cent. of water.

In the subsequent experiments, when mention is made of hydrous carbolic or cresylic acid, the products obtained as above are to be understood.

1. *Action of Cold.*—Absolute carbolic acid is solid at ordinary temperatures, and the hydrous substance solidifies in a freezing mixture of hydrochloric acid and crystallized sulphate of sodium. Neither absolute nor hydrous cresylic acid, nor creasote, shows any signs of freezing on exposure to the same degree of cold.

2. *Solubility in Water.*—Twenty cc. of water at about 170°C., dissolved 1·8 cc. of hydrous carbolic acid. This corresponds to a solubility of 1 volume in 11·1 of water. Hence the saturated aqueous solution contains 8·56 per cent. by weight of the absolute acid, corresponding to a solubility of one part by weight of absolute acid in 10·7 parts of water. This is a far greater solubility than is generally attributed to carbolic acid, the discrepancy being probably due to an impure acid being generally used. In hot water carbolic acid is still more soluble.

Hydrous cresylic acid dissolves in about 29 measures of water at about 20°C., which represents a solubility of 1 part by weight of absolute cresylic acid in about 31 parts of water.

3. *Solubility at* 15·5°(*C*=60°F.) *in solution of Caustic Soda containing* 6[1] *per cent. of* NaHO.—Absolute carbolic acid is completely soluble in an equal volume of soda solution containing 6 per cent. of pure NaHO (free from alumina). Addition of more of the alkaline solution up to 6 volumes causes no change, the liquid remaining clear. Absolute cresylic acid is insoluble in small proportions of 6 per cent. soda solution. When a large excess (9 volumes) is added, it disappears and forms distinct crystals.

Creasote is practically insoluble in 6 per cent. solution of soda.

4. *Solubility at* 15·5° *C. in solution of Caustic Soda containing* 9[1] *per cent. of* NaHO.—Absolute carbolic acid is soluble in an equal measure of 9 per cent. soda. On addition of any proportion of water up to 7

[1] These solutions contained respectively 94 and 91 grams of water to each 6 and 9 grams of pure caustic soda.

volumes the liquid remains clear, but is precipitated by 8 volumes of water. Carbolic acid is also soluble in 2 measures of 9 per cent. soda, and is not precipitated by less excess of the reagent than 5 or 6 measures. Absolute cresylic acid is soluble in an equal measure of 9 per cent. soda, but is precipitated when the proportion of the reagent is increased to $3\frac{1}{2}$ volumes. If to a clear mixture of equal volumes of cresylic acid and 9 per cent. soda, a few drops of water be added, precipitation occurs, and when the proportion of water is increased to one volume, the orginal bulk of cresylic acid separates out. Hence, cresylic acid is insoluble in two measures of $4\frac{1}{2}$ per cent. soda solution.

Creasote is insoluble in any smaller quantity than two volumes of 9 per cent. soda. It is partially reprecipitated when the proportion of the solvent is increased to more than three and half measures.

5. *Solubility at* 15·5° *C. in solution of Ammonia* (*sp. gr.* ·880).—Carbolic acid is completely and readily soluble in an equal volume of strong ammonia. The solution is not precipitated by addition of less than one and half volume of water. A mixture of one part of carbolic acid and three of cresylic acid is soluble in an equal measure of ammonia, but the solution is precipitated on adding even a few drops of water.

6. *Behavior with Benzol.*—Absolute carbolic and cresylic acid and creasote are miscible with benzol in all proportions.

The hydrous substances dissolve in five volumes of benzol with complete separation of the water. Hence benzol may be used for the determination of the proportion of water present in samples of carbolic and cresylic acid.

7. *With Chloroform, Carbon Disulphide, or Ether.*—Carbolic acid, cresylic acid, and creasote react in much the same manner as with benzol. Agitation with 9 per cent. soda removes them from their solutions in the above solvents.

8. *Behavior with Petroleum Spirit of sp. gr.* ·669 (*Commercial "Benzoline"*).—Absolute carbolic acid dissolves half its volume of petroleum spirit, forming a clear liquid. On addition of a larger proportion of petroleum spirit precipitation occurs.

With one volume of carbolic acid and three of petroleum spirit the layers have about the same measures as the original liquid. Each layer, however, contains both liquids, as may be proved by cooling the

tube with a freezing mixture (or by wrapping filter paper round it and dropping ether on the outside), when carbolic acid crystallizes out.

Absolute carbolic acid is permanently soluble in about ten measures of petroleum spirit at 15·5C. (=60°F.). The solubility is enormously increased by rise of temperature. Hence carbolic acid and *hot* petroleum spirit are miscible in all proportions. On the other hand, by cooling with a freezing mixture the carbolic acid is almost wholly deposited.

If the cooling occurs slowly it forms a heavy liquid layer with a portion of the petroleum spirit, but by rapid cooling the carbolic acid is deposited in long crystalline needles which render the liquids semi-solid.[1]

Hydrous carbolic acid is almost insoluble in moderate quantities of cold petroleum spirit, which liquid does not separate the contained water from it. (Another difference between benzol and petroleum spirit.) Absolute cresylic acid appears to be miscible with petroleum spirit in all proportions.

No separation, either of crystals or liquid, occurs by exposing a solution of one measure of the acid in three of petroleum spirit to a freezing mixture.

When hydrous cresylic acid is treated with cold petroleum spirit the volume of the former increases somewhat by dissolving a little of the spirit, but on addition of a greater volume of petroleum spirit it undergoes slight solution. It is only very sparingly soluble in petroleum spirit, requiring upwards of twenty volumes for complete solution, when the water separates. Creasote is miscible with petroleum spirit in all proportions.

9. *Behavior with Glycerin of* 1·258 *sp. gr.*—Absolute carbolic acid is miscible with Price's glycerin in all proportions. A mixture of one volume of carbolic acid with one of glycerin is not precipitated on addition of three volumes of water. In presence of 25 per cent. of cresylic acid precipitation occurs on adding more than two volumes of water.

[1] Crystallized carbolic acid may be used for distinguishing between coal-tar benzol and petroleum spirit. In the latter it is sparingly soluble, and is re-deposited in a crystalline state by rapid cooling. With benzol it is miscible in all proportions, the crystals of carbolic acid rapidly melting. A solution of one in three deposits no crystals by rapid cooling.

Absolute cresylic acid is miscible with Price's glycerin in all proportions. A mixture of one volume of glycerin and one of cresylic acid is completely precipitated by one volume of water.

Creasote is insoluble in Price's glycerin, whether it be added in the proportion of one, two or three volumes for one of creasote. The sample of Price's glycerin used for the above experiments was found to have a density of 1·258.

10. *Behavior with Collodion.*—Absolute carbolic or cresylic acid, when shaken with half its measure of *Collodium, B. P.*, precipitates the nitro-cellulose in a transparent gelatinous form, very difficult to see. It is best observed by inclining the tube and causing the liquid to flow gently from one end to the other. Creasote does not precipitate the nitro-cellulose from collodion, but mixes perfectly with its etherial solution. Addition of much creasote to a mixture of collodion and carbolic or cresylic acid causes the re-solution of the precipitated nitro-cellulose.

11. *Reaction with Ferric Chloride.*—The addition of one drop of a 10 per cent. aqueous solution of ferric chloride to 15 cc. of an aqueous solution of cresylic or carbolic acid causes a permanent violet-blue coloration. When creasote is similarly tested a blue color results, which almost instantly changes to green and brownish-yellow.

Other distinctive tests for creasote and carbolic acid are to be found in the books, but are almost worthless in practice. Thus the reactions with bromine, sulphuric acid and nitric acid are far too much alike to be of service for distinguishing between these bodies. It has been stated that creasote differed from carbolic acid in its power of rotating a ray of polarized light. I redistilled a sample of Morson's creasote to obtain it colorless, and carefully tried this test, expecting to find in it a possible means of determining the creasote in a mixture, but the rotating powers of creasote proved so exceedingly weak as to be quite worthless for the intended purpose, or even as a qualitative test. It is, however, quite possible that different samples of creasote may exhibit considerable differences in this respect, but if so the test is valueless for qualitative purposes, and the problem is not so much to detect wood-creasote as to recognize an admixture of the coal-tar acids. I am also unable to confirm the statement that creasote gives a solid deposit when kept for some hours at the temperature of boiling water.

I have not obtained satisfactory results by the reaction of an alkaline solution of the substances with hydrochloric acid and pine-wood, or

with a solution of iodine in iodide of potassium. Sulphomolybdic acid, also, gives a blue color alike with creasote and carbolic acid, even when the test is applied to an aqueous solution of the sample.

From the foregoing details it will be seen that in various manners carbolic acid, cresylic acid and wood-tar creasote can be readily distinguished from each other. The case, however, is very different when we have to deal with a mixture of the three substances, such as occurs in the case of a sample of creasote adulterated with crude carbolic acid. In such a case many of the tests are greatly reduced in value or rendered absolutely worthless. As the problem is to detect the coal-tar acids in presence of wood-creasote, rather than the reverse, only affirmative tests for the former bodies are of service, and in many cases these are seriously modified by the simultaneous presence of creasote. Thus, as has been pointed out by Mr. J. Williams, the ferric chloride test entirely fails to detect the presence of carbolic acid in a mixture of equal parts of that substance and creasote.

The only marked differences I have been able to observe between Morson's creasote and a mixture of equal measures of that liquid and Calvert's No. 5 carbolic acid are the following:

When shaken with twice its bulk of 9 per cent. soda solution, pure creasote is dissolved, and remains in solution when the solvent is increased to three volumes. The *mixture* was insoluble either in two, three or four times its volume of 9 per cent. soda. This anomalous result proved to be due to the presence of water, which reduced the strength of the soda solution. When the water was previously expelled by boiling from the mixture of crude carbolic acid and creasote, solution took place with three volumes of soda.

When shaken with Price's glycerin (sp. gr. 1·258) pure creasote remained undissolved, though the proportion of glycerin was varied from one to three volumes. The mixed creasote dissolved completely and readily in an equal measure of glycerin. The liquid was not affected by a drop or two of water, but a further addition caused precipitation. A mixture containing 25 per cent. of creasote, when shaken with an equal measure of glycerin, was not precipitated by less than $1\frac{1}{4}$ volume of water.

Shaken with half its volume of collodium (B. P.), pure creasote dissolved to a clear liquid. The mixed creasote showed decided signs of precipitation when the liquid was allowed to run gently from one end

of the tube to the other. With a mixture of two volumes of Calvert's No. 5 acid to one of creasote, the precipitation of the nitrocellulose was very marked.

As carbolic acid, cresylic acid and creasote boil at temperatures tolerably widely apart, I thought it might be possible to effect a sufficient separation by fractional distillation to enable the tests for the coal tar acids to be more readily applied. For this purpose I introduced a mixture of No. 5 carbolic acid and Morson's creasote into a small retort and distilled the liquid. The water which first came over was collected separately. The next portion of the distillate (amounting to about one-fifth of the whole bulk of the liquid) was boiled to free it from a little water, and was then tested with glycerin and with collodion. It dissolved readily in the glycerin, and precipitated half its volume of the collodion. Hence the carbolic acid of the mixed creasote was fairly detected, and there seems no reason why fractional distillation should not serve for the detection of smaller proportions of carbolic acid, as it will certainly be most abundant in the first portions of the distillate. The ferric chloride test was not found of service for testing the distillate, sufficient creasote being present to produce a decided brown coloration.

As the tests with glycerin and collodion are the only reactions of service with mixtures of carbolic acid and creasote, I did not think it necessary to apply the other tests to the distillate.

It will be seen from my experiments that the high value usually attached to the glycerin test is amply justified. It has been stated that pure creasote was soluble in anhydrous glycerin. This is certainly not my experience, but if it be true that some varieties of creasote dissolve in absolute glycerin they will doubtless be precipitated by the least dilution, and can thus be distinguished from mixtures containing considerable proportions of the coal-tar acids.

Mr. J. Williams examined a sample of German creasote which was supposed to be pure, and which dissolved in glycerin; but the fact that 40 per cent. of the sample distilled at 200 to 203, together with other characters, renders it very probable that it contained an unacknowledged mixture of the coar-tar acids. It must not be forgotten that cresylic acid is much cheaper than carbolic, and is far more difficult to distinguish from creasote, even when unmixed with it.

I have thought it best to place my results on record in the fullest

possible detail, as it is just the omission to do this that has caused so many confusing and incorrect statements to appear in our text-books. The tests described are remarkably liable to failure when the conditions are slightly varied. This is notably the case with the reactions with solutions of soda, a change of temperature or strength of the solvent causing extraordinary variations in the results.—*Pharm. Jour. and Trans.*, Sept. 21, 1878.

NOTE on NITRATE of SILVER CONTAINING GOLD.

By E. B. Suttleworth.

It does not appear that any of our chemical or pharmaceutical authorities give gold as one of the contaminations of nitrate of silver, yet such admixture is not only possible, but frequently to be met with in common grades of nitrate which have been prepared directly from solutions of the metal. All commercial refined silver contains gold, though perhaps in only the most minute quantity. Of nearly three tons which have been dissolved under the writer's supervision, none could be described as perfectly pure or free from the more precious metal. English refined silver generally contains more than American stamped bars, of which a considerable quantity must be operated on in order to render the gold appreciable.

If such silver be dissolved in ordinary nitric acid containing traces of hydrochloric acid both metals will be dissolved, and, as long as the solution is acid and concentrated, minute quantities of both chloride of silver and chloride of gold will be retained. Crystals deposited from the liquor will also contain traces of gold. Such crystals have a faint purplish tinge, as also the solution, so that in color it resembles water containing a very small quantity of logwood ink.

I am not prepared to say in what particular form or combination the gold exists in the silver salt, nor yet to state the effect of this impurity on the photographic film. It is, however, possible that some of the troubles of photographers—as, for instance, that technically known as fogging—might, in some degree, be due to the presence of this con tamination.

The impure salt may be readily prepared for experiment by adding to a concentrated hot solution of pure nitrate of silver a few drops of solution of chloride of gold. Flocks of chloride of silver holding

gold are precipitated, but, by the addition of a little pure nitric acid, are dissolved, and, if the solution be set aside, crystals similar to those described may be obtained.

Nitrate of silver containing gold may be purified by fusion. On dissolving the cake in water the gold will be deposited, or may be removed by filtration through asbestos.—*Can. Phar. Jour.*, Nov., 1878.

PREPARATION of PERMANENT RENNET-ESSENCE.

By H. Soxhlet.

For the preparation of concentrated solutions only dried calves' stomachs are suitable, and those which have been blown out with air and dried as quickly as possible are best. The small stomachs of the youngest animals are richest in ferment. Fresh stomachs are useless for preparing a concentrated essence, as they yield a thick jelly, which by filtering gives only a small quantity of liquid. Concentrated extract prepared from stomachs after 14 days is light-yellow in color, whilst that prepared after 6 to 8 months' storage of the stomachs is dark-brown. This results from slight decay of the stomach, and as the color does not affect the usefulness of the product it is advisable to use stomachs which have been stored for at least three months. The portion of the stomach without folds, the Portio pylorica, is cut away, as it is poor in ferment.

Acid liquids are usually employed for extracting, as they seem to produce richer solutions, but this is only because they act more quickly at first than water alone. Hydrochloric acid containing 0·1 and 0·2 per cent. of acid in two days gave extracts twice as rich in ferment as an aqueous one, but after eight days all three solutions were equally strong. A little thymol was added to prevent decomposition during the experiment. When the temperature is raised to 30° to 35° water acts more rapidly than the acid, and the solution is richer than that produced by acid at the ordinary temperature.

Attempts were made to produce concentrated solutions by means of dilute acids, but without success. A 0·3 per cent. solution of salicylic acid gave a liquid which was quite fresh after twelve months, but after only two months its activity had fallen off to the extent of one-half.

A series of experiments made with solutions of common salt con-

taining from two to twenty-six per cent. shows that solutions containing three to six per cent. of salt yield the liquids richest in ferment and capable of the highest degree ot concentration. This property of dilute salt solutions depends on the fact made known by Graham, that common salt is a very easily diffusible substance. Organic acids in combination with common salt are no better extraction agents than the salt alone. Five per cent. solutions of sodium or potassium sulphate are less efficacious than the same strength of salt solution. Potassium chlorate behaves in much the same manner as common salt; an excess of the chlorate, however, neither acts as efficiently as a precipitating agent nor as a preventer of decomposition.

Sixty to eighty grams of calf's stomach, steeped for five days in one liter of a five per cent. solution of common salt at ordinary temperatures, yield a solution of which one vol. will coagulate 10,000 vols. of new milk at a temperature of 35° in forty minutes. If the filtered solution is treated with sixty to ninety grams more of stomach a solution of double strength is obtained; another repetition gives a solution three times the strength of the original one.

To prevent decomposition about 0·3 per cent. of thymol may be added to the concentrated rennet extract solution. Possibly a slight taste due to this may be detected in the finest cheese, but for the same reason oil of cloves is much more objectionable. Boric acid is on all accounts the best antiseptic to employ, and solutions to which it has been added may be kept in covered vessels for months. All extract solutions lose strength on keeping; during the first two months the solution may become thirty per cent. weaker, then the strength remains nearly constant for eight months in the case of a solution of 1 : 18,000. Alcohol is almost as good an antiseptic as boric acid if the solution be preserved in well-stoppered flasks.

Detailed experiments are given, showing that the time required to coagulate milk is inversely proportional to the strength of the extract solution. From this the strength of a solution can be determined by adding 1 cc. to 1 liter of milk at 35°C. and noting the time required to coagulate the milk; this time multiplied by 10 gives the time for the proportion 1 : 10,000.—J. T. *Jour. Chem. Soc.*, October, 1878, from *Dingl. polyt. Jour.*, ccxxviii, 341—349.

MEMOIR OF THOMAS H. POWERS.

Read before the College at a Stated Meeting December 30, 1878.

Thomas Henry Powers, son of Thomas and Susan Powers, was born in the city of Philadelphia, October 17, 1812. His maternal ancestry were descended from and connected with some of the good old colonial families belonging to the Society of Friends.

There were two children, both boys. Thomas was the elder, the younger died in childhood.

Mrs. Powers resided with her sisters at No. 17 North Seventh street (old number). She died while Thomas was quite young, and the charge of him in his boyhood devolved upon his aunts, Mary and Martha B. Pearson. The sisters were mantua makers and had a small dry goods store at the above mentioned locality, and were quite noted as dress makers, having a considerable custom outside of the city.

In 1830 Mary and Martha B. Pearson removed to No. 16 North Sixth street (old number), to a house owned by John Grandom, their cousin, where they continued the mantua making business until about the year 1834, when they withdrew from business, Thomas having grown up and attained a position which enabled him to contribute to the support of the family In 1839 they removed to a house on Buttonwood street, near Eighth street, from which in 1844 they removed to a dwelling purchased for them by their nephew, No. 615 Wood street, where Martha died in 1847 and Mary in 1869.

The care which his aunts had exercised over him during his boyhood was repaid by Thomas in his manhood with filial affection. He provided for the comfort of their declining years, and attended seduously to the care of them as long as they lived. After their death he manifested his appreciation of the services of two faithful domestics who had long waited on them, by giving to one the furniture of the house and by selling to the other a dwelling suited to her requirements for a nominal consideration.

At the age of seven years Thomas was sent to the "Ludwick School," on the north side of Walnut street, above Sixth street.

The "Ludwick School" was established by "The Philadelphia Society for the establishment and support of Charity Schools." This society was incorporated in September, 1801, in conformity with the will of Christopher Ludwick, a wealthy and benevolent German citi-

zen, who held the position of "Baker-general to the army of the United States during the Revolutionary war."

Mr. Ludwick deceased June, 1801, leaving his residuary estate, estimated then at $8,000, "to the association which should be first incorporated for the purpose of teaching gratis the poor children of the city or liberties of Philadelphia, without any exception to the country, extraction or religion of their parents or friends."

In 1804 a lot of ground was purchased on the north side of Walnut street, above Sixth street, and a neat two-story brick edifice was erected and completely fitted up for the reception of scholars. On the decease of the widow of the testator the society became possessed of further property, making the Ludwick bequest about $13,000.

In 1859 the schools were removed from Walnut street to the Beck school house on Catharine street, above Sixth street, where a flourishing school is still maintained by this society.

In 1860 the society report "already about 19,000 children have been pupils in the schools established by the society, and among the names are those of some of our most prominent and valuable citizens." "Within the walls of its school-room, and by its members, in connection with other philanthropists, the law passed in 1818 establishing the common school system in Philadelphia was devised and drafted."

From the records of this society, in 1827, we make the following extract:

"The committee report that on an examination of the records they find that Thomas H. Powers was admitted a scholar in Fourth month, 1819, and continued until Third month, 1827, a period of nearly eight years, during which time from the report of Thomas Walter, his teacher, it appears that his deportment was unusually exemplary, and the diligence and attention with which he pursued his studies altogether satisfactory.

"At the time of his admission he was seven years of age and could spell but indifferently, but by close application, although the state of his health frequently occasioned his absence, he became a good reader, writer and arithmatician, and also became tolerably proficient in mathematics and book-keeping.

"The teacher states as a remarkable circumstance, that during the whole time which this lad was under his care he does not recollect that he ever had occasion to punish him or even speak a harsh word to him. Indeed, all the information received by your committee, as well as their personal knowledge of him, is such as to induce them to believe that an expression of approbation of his conduct by the Board of Managers is justly due to him, and may operate as an encouragement to others to follow the excellent example he has set his fellow-students while in school. They therefore offer the following resolution:

"*Resolved*, That the Board deem it due to Thomas H. Powers, late a pupil in the Walnut street school, thus to award to him the evidence of its approbation of his conduct, diligence and acquirements in learning during a period of nearly eight years in which he remained in the school; and as a further testimony of their approbation, be it

"*Resolved*, That a committee be appointed to purchase such books as they may think proper, to the value of five dollars, and present the same to Thomas H. Powers in the name and on behalf of this Board."

[Signed.] JOHN CLAXTON, PHILLIP GARRETT, } *Committee.*

Philadelphia, Fifth Mo. 25, 1827.

In the year 1828 he entered the store of Daniel B. Smith, at the northeast corner of Arch and Sixth streets, to learn the drug business. A few months after his apprenticeship William Hodgson, Jr., an able pharmacist and chemist, brought up in the celebrated establishment of John Bell & Co., Oxford street, London, entered into partnership with D. B. Smith under the firm name of D. B. Smith & William Hodgson, Jr., a partnership which continued at the same location until the close of the year 1848, when they were succeeded by Bullock & Crenshaw.

We have been favored by a fellow-apprentice with Mr. Powers of his recollections of him during this period, and can not do better than to quote his words:

"The means of his aunts were restricted, and his early habits were very economical. I think his clothing, which I remember as somewhat peculiar, was usually made at home. In the latter part of his apprenticeship he had a coat made by a tailor, which he considered quite an event.

"He was a faithful apprentice, laborious and indefatigable in his attention to business, and in many respects was the main dependence of the establishment. He wasted no time in the pursuit of youthful recreations, the reading selected by him was not for amusement but for information and instruction, especially on subjects which were connected with his business (which he made his pleasure), and consisted mainly of chemical and pharmaceutical works and occasionally of moral and religious books.

"I remember a little book then in my possession, entitled 'Character Essential to Success in Life,' of which he formed a high opinion. In after years he applied to me to ascertain the exact title of the book with a view to having it reprinted for distribution amongst young men.

"He was aspiring and strove to qualify himself for whatever duties might devolve upon him. He had a laudable ambition to make his way in the world by industry, enterprise and upright conduct, and he seemed to have no fear of his ability to do so.

"During his apprenticeship he studied French, taking evening lessons, with a view chiefly of its enabling him to read chemical and pharmaceutical publications in that language.

"The Journal of the Philadelphia College of Pharmacy contains a translation made by him at that time of two elaborate papers by M. Robiquet and Boutron Charlard on bitter almonds and their essential oils.[1]

"In 1832 his health failed; he became very much prostrated, and his friends became solicitous on his account. He was sent into the country to the farm of one of his relatives and was absent for some months. For a time his recovery seemed doubtful, accounts reaching us that he was sustained only by careful nursing and a generous diet. He returned to the store in apparently good health, and although never robust, enjoyed uniform good health and vigor.

"About this time he came under strong religious impressions. I remember frequent conversations which he had with Samuel Hallowell, a fellow apprentice (afterwards a clergyman of the Episcopal church), on religious subjects and the views held by different denominations."

The result of his religious exercise was his baptism in St. Andrew's Church—Rev. Gregory T. Bedell, Rector—November 29th, 1833, and his confirmation in the same church March 16th, 1834.

When his pastor, the Rev. John A. Clark, Rector of St. Andrew's Church (successor of Dr. Bedell), went to Europe in 1837, on account of failing health, Mr. Powers took a lively interest in facilitating his departure. He had a tin medicine case made, and furnished it with medicines for his pastor's use.

He was also at that time much interested in and occupied with the affairs of Emanuel Church, in Kensington. After the Rev. Mr. Clark left St. Andrew's Church, Mr. Powers attended St. Paul's Church, and had a Sunday-school class there. "I remember," says a fellow-apprentice, "on the Sundays when it was his turn to attend part of the day at the store, it was his practice, in order to be in time for

[1] Vol. iv, 1833, p. 67.

his school, to make a cup of tea in an infusion mug, and this, with a few crackers, constituted his spare and hasty dinner."

On the decease of Hart Grandom, a cousin of his mother's, Mr. Powers inherited a legacy of two thousand dollars, as a capital to commence business with.[1] This tended to promote his confidence in the future, as he felt that it would enable him at a proper time to open a retail store on his own account, if no better opportunity presented.

The house in which his aunts resided, on North Sixth street, was owned by their cousin John Grandom, who had intended leaving it to them; an unexecuted conveyance to that effect was found among his papers. His will made no mention of the property, and it passed, as a part of his residuary estate, to a charitable institution in this city. The sisters were generously permitted to continue their occupation of the premises for a nominal rent. After Mr. Powers became of age he invested his legacy of $2,000, with $500 additional, in the purchase of this property for his aunts.

In 1833 he graduated at the Philadelphia College of Pharmacy, and was the twenty-fifth on the list of graduates of the college. His thesis, "Remarks on Extemporaneous Pharmacy," was published in the "American Journal of Pharmacy."

Before his graduation Mr. Powers participated in the proceedings of the Philadelphia Chemical Society, instituted in February, 1828, and continued until the close of 1830. On the records of this Society is found a paper read by Mr. Powers, in 1829, "On Tartar Emetic"; in 1830, one "On Barium and some of the Salts of Protoxide of Barium," and in the same year an essay "On the Preparation of Iodide of Mercury."

In 1835 he was elected one of the trustees of the college, and served for six years. From November, 1835, to May, 1838, he filled the position of Secretary to the Board of Trustees. The cares attendant upon the rapidly increasing business of the firm with which he was soon afterwards connected precluded his active participation in the affairs of the college; we have, however, abundant evidence that his interest in the work in which the college was engaged remained unabated during his life. The new channel into which his energies

[1] "To Thomas H. Powers two thousand dollars. I hope Thomas will not enter largely into business so as to risk and lose what he has or may receive."—*Will of Hart Grandom. July 16, 1834.*

were directed by his change in business has deprived us of any subsequent contributions to those sciences, in which he took great interest and for which he possessed much natural adaptation.

After he attained to his majority he remained with Smith & Hodgson, as an assistant on a salary, until 1834 (or 1835), when D. B. Smith removed to Haverford College, as one of its faculty, when Mr. Powers was taken into partnership with the firm.

After his admission into the firm, at Arch and Sixth streets, he applied himself assiduously to increase the business of the house. About this time morphia was coming into general use in place of opium as a narcotic; Mr. Powers demonstrated by experimental trial that this alkaloid could be successfully and profitably manufactured here, and urged the consent of the firm to embark in the enterprise. They, however, did not see the way clear to do so; in after life Mr. Powers has reverted to this period, and remarked that "a great opportunity was then lost."

It was about the year 1836 that he formed an intimate acquaintance with Mr. John Farr, who previously had noticed him and formed a high estimate of his character and qualifications.

In 1838 he left Smith & Hodgson, accepting an offer made to him by Mr. Farr to join him in the chemical manufacturing business, on Coates street above Fourth street, Mr. Farr associating with him his nephew, Mr. William Weightman, and Mr. Thomas H. Powers, under the firm name of John Farr & Co. The reputation of the house of Farr & Kunzi was already well known and stood high for the purity of their chemical products, but the business was then comparatively small.

After connecting himself with the house, Mr. Powers devoted all his energies to his new position; his days and evenings were spent at the office and laboratory. He labored first to acquire a complete mastery of the business in every detail, and afterwards to extend it in every feasible direction, and by every honorable means. The reputation and trade of the house grew rapidly, until it became, as we know, the leading establishment of this country, and probably one of the largest in the world, engaged in the manufacture of medicinal and other chemicals.

The religious impressions of his early life had crystalized into a Christianity which was vital with him, influencing and controlling him in all his conduct. The care of his increasing business—of which he

always continued the control—sat lightly on his shoulders, and he was ever ready to lay them aside for a time, when called upon for consultation or advice by his friends, and by business acquaintances in their emergencies. His manner at such times will long be remembered by all who sought his advice; an almost paternal interest seemed to invest his counsels.

His mind had the faculty of grasping almost intuitively the important points of the subject presented to it—the situation seemed to be mastered at once—while he was patient and penetrating in the examination of details, for which he had a remarkable memory.

His advice was given frankly, and he was always ready to do his part if he thought the occasion deserving and likely to result in permanent benefit.

While inflexible and outspoken in opposition to what he thought was wrong in conduct or erroneous in principle, he was considerate to weakness and compassionate in misfortune.

His contributions to charitable purposes increased with his means, and were dispensed with thoughtful kindness and conscientious care. How large and various these benefactions were was known to but few, for they were made, not with a view to public applause, from which he instinctively shrunk, but were prompted by the high motive of love to his fellow-men.

He retained in a remarkable degree his early friendships, and however advancing years might have left their impress on his person, his friends found but little change in the man himself.

On the 16th of November, 1878, Mr. Powers left his office on account of indisposition, which developed into pneumonia. He died at his residence, No. 1618 Walnut street, on the 20th, in the 67th year of his age.

Mr. Powers was married in 1841 to Miss Anna Matilda Cash. His only son died in March, 1873. He leaves a widow and one daughter.

The faithful, conscientious character which had been formed in early manhood remained unchanged. He was unspoiled by success, as he had been undaunted in difficulty. His whole life has been, in all its relations, a bright example of industry, perseverance, Christian faithfulness and good works.

A short sketch of the history of the house of Powers & Weightman will be of interest to the members of this college.

The founder of the house of Powers & Weightman, Mr. John Farr, was brought up to the drug business in London, aud came to the United States at an early age, possessed of but little pecuniary means. The commencement of his business was in an humble way. The firm of Farr & Kunzi was established about the year 1818. Their first location was on the north side of Arch street, near Twelfth street. In 1820 they removed to the south side of Coates street, above Fourth street. In 1821 or '22 they purchased the property at Ninth and Brown streets, then on the outskirts of the city; to this location they removed in 1839.

Mr. Kunzi retired from business in the year 1836. In 1838 Mr. Farr associated Mr. Powers and Mr. Weightman with him, under the name of John Farr & Co. Three years afterwards the firm name was changed to Farr, Powers & Weightman. After the decease of Mr. Farr, in 1847, the name of the firm was changed to Powers & Weightman.

About this time the operations of the house were much increased by the establishment of the works at the Falls of Schuylkill for the manufacture of chemical products used largely in the arts.

The time of the first manufacture of quinia in Philadelphia is alluded to in a paper read by Mr. John Farr before the Philadelphia College of Pharmacy, December 27, 1825, as follows: "In the summer and autumn of 1823, a season peculiarly memorable to Philadelphia by reason of the alarming prevalence of intermittant and other fevers, the sulphate of quinia was first successfully manufactured here."[1]

In the first quarter of the present century nearly all chemical and a large portion of the pharmaceutical products used in the United States were imported from Europe. The earliest chemical manufacture in Philadelphia of which we have information was carried on by Gerard Troost, M.D. Dr. Troost delivered one course of lectures on chemistry in the Philadelphia College of Pharmacy in the winter of 1821–22; he afterwards removed to Tennessee, and was instrumental in the establishment of the University of Nashville.

[1] Journal of Phil. Col. of Pharmacy, May, 1826, "On Extract of Quinia."

The house of Farr & Kunzi had established a good reputation for their products, and when the energy and ability of the new partners of Mr. Farr were brought into active participation in the affairs of the house the business expanded rapidly until it developed such proportions as to enable the firm to supply a large part of the medicinal products and chemicals demanded for consumption in the United States.

For more than thirty years (since the death of Mr. Farr) the commercial department of the business has been under the supervision of Mr. Powers, while upon his partner, Mr. Weightman, devolved the exclusive management of the manufacturing.

Mr. Powers retained his early interest in pharmacy, and guarded with sedulous care the quality and appearance of the articles which left their establishment. The production of the cheaper alkaloids of cinchona barks in a condition of purity was an object in which Mr. Powers took great interest; for a magnificent display of these products the firm was awarded a Gold Medal in 1874, by the Franklin Institute.

There has been considerable reflection made at times when a revision of the duties on imports was before the public, or the influence exerted by the manufacturers of quinia to retain the duty on that product. "A tax on fever-stricken patients," has been the favorite motto of the advocates of "free quinia." The practical working of the problem has repeatedly been shown by importers making a large advance on quinia upon the advent of malarial fevers in the South and West, while the manufacturers of quinia in the United States have always stood firm in a resistance to such speculative movements.

Mr. Powers was personally well-known to many in the trade throughout the United States, and by such will be greatly missed. Upon his surviving partner, Mr. Weightman, will devolve the management of the business. Mr. Weightman's connection with the establishment commenced as a boy in 1829. Trained practically in the commercial as well as in the manufacturing department, the old friends of the house will find him eminently deserving of their confidence.

THE GUTTA-PRODUCING PLANTS OF THE MALAY PENINSULA.

In an appendix to a report of an expedition to Perak, recently made by Mr. Murton, the Superintendent of the Botanical Gardens, Singapore, a good deal of information is given regarding the sources of the different kinds of gutta produced in the Malay Peninsula. Five varieties are enumerated, and their respective values in Perak and Salangor given as follows:

	Price per Picul.	
	In Perak.	In Salangor.
1. Gutta-soosoo,	50 to 52 dols.,	not known.
2. Gutta-taban,	45 to 50 "	50 dols.
3. Gutta-rambong,	32 to 35 "	not known.
4. Gutta-singgarip,	17 to 20 "	20 dols.
5. Gutta-putih-sundek,	15 to 30 "	15 dols.

Of the first, gutta-soosoo, Mr. Murton was unable to obtain any samples of the tree producing it, and the only information he could gather concerning it was, that the tree is entirely destroyed, except in the interior of Perak; that the gutta is firmer in texture than gutta-taban, and contains a little oil. This must not be confounded with the gutta-soosoo of Borneo, which is a caoutchouc or rubber.

The second, or gutta-taban, is the gutta-percha of commerce, and the product of a tree described so far back as 1837, by Sir William Hooker, under the name of *Isonandra gutta*, but now known to botanists as *Dichopsis gutta*, Bth. It appears that in Perak there are two sorts, alike in foliage and general appearance, and differing only in the color of the flowers, one being white and the other red. They are known to Malays by the names of *Ngiato putih* and *Ngiato merah*, but the products of both trees are called gutta-taban. *Dichopsis gutta* is most abundant on Gunongs Meeru and Sayong, and Bujong, Malacca. A few large trees still exist on Gunong Babo and the Thaipeng range. Small plants, from one to eight feet, are abundant on the granite formations in Perak up to 3,500 feet elevation.

To procure the milk, the tree is cut down at five or six feet from the ground, and the top cut off immediately, when it becomes too small for ringing. This, the natives say, causes the tree to yield a much larger quantity. The bark is then ringed with knives, called "golos," at intervals of from five to fifteen inches. The milk continues to flow for about an hour, and is collected in vessels made of palm-leaves or cocoanut shells, and then boiled for about an hour, otherwise it becomes brittle and useless. Regarding the quantity of gutta each tree is capable of producing, no trustworthy information seems to have been obtained. One of the principal merchants of Perak informed a member of the expedition that a large tree would yield forty catties of gutta, but Mr. Murton regards this as an exaggeration, for from numerous inquiries among the men in the jungles he was told that from five to fifteen catties is about the average quantity obtained, and never more than twenty catties. No particular season seems to be recognized in Perak for collecting the gutta, and Mr. Murton was unable to glean any information as to whether or not the trees yield more in one season than in another. He considers, however, that in the wet seasons the gutta contains more water, and consequently would require more

boiling to drive it off. It is stated that from Klang eighty-three piculs eighty-three catties were exported from January to November, 1877; so that it is probable over 700 trees were destroyed to furnish that quantity. The gutta is generally, if not always, exported in the shape of oblong balls, with a loop at the upper end, through which a piece of rattan is put to facilitate its being carried through the jungles. These balls vary considerably in weight, but from ten to twenty catties is about the average. They are of a greyish-white color, with a slightly reddish tint inside. The color, however, varies according to the quantity of bark and other impurities mixed with it; sometimes it is of a bright umber-brown.

For the cultivation of *Dichopsis gutta*, it is recommended that plants not more than a foot high should be procured from the jungles; it is necessary to lift them very carefully as they have long tap roots which are liable to be broken or injured, in which case the plants, even if they survive, take a long time to recover.

The third kind of gutta, namely, *gutta-rambong*, is described as being more of the nature of caoutchouc or india rubber. Mr. Murton did not find the tree producing it, and he was informed by the Malays that it was only to be met with in the interior of Perak and on the Patani side of the Peninsula. These people describe the tree as having large roots above ground, and large, bright-green leaves, with red tips to the branches. The milk is obtained from these large roots, which are tapped ten or twelve times a year, a picul being sometimes taken from a large tree; the usual yield, however, is said to be about half a picul. This rubber is said to require no preparation for market; it has the appearance of long strings, irregularly welded together; the best quality has a gum-like appearance, is very firm in texture and of a reddish-brown color; the inferior qualities have a large admixture of bark, etc., and are much drier without the gum-like consistency of the better qualities. The caoutchouc from Perak has much the same appearance as Assam rubber, and Mr. Murton considers there is but little doubt that it is produced by the same tree, *Ficus elastica*, the description given by the Malays agreeing closely with that of the above-named plant, the red points to the branches being probably the conspicuous red stipules which envelop the young leaves. From the fact that young plants have been promised to the Singapore Gardens, it is to be hoped that ere long the origin of gutta-rambong will be definitely settled.

Another caoutchouc, or india rubber, is *gutta-singgarip*. This agrees very closely in texture, appearance and in the mode of operation with the gutta-soosoo of Borneo, and Mr. Murton says that an experienced authority, who had spent some time among the gutta-soosoo collectors in Borneo, assured him that they are one and the same product. The plant producing it is a large woody climber, with stems about six or eight inches in diameter, but often much less. There are two varieties, one with very dark colored outer bark and lighter colored warts, and red inner bark; the other with outer bark light cork-colored, with longitudinal channels, and the inner bark light yellow. The foliage of both plants are described as being very similar to each other, but the fruits differ in form, one being apple-shaped and the other pear shaped. The fruits of both forms are edible, and are readily sought after by the Malays. The plants seem to be species of *Willoughbeia*, belonging to the natural order *Apocynaceæ*. The gutta from the dark-barked variety is considered

the best. The long, scandent stems are often cut down to procure the milk, but it is not absolutely necessary to do so, except to render the operation of collecting the gutta easier. The stem is generally ringed at intervals of ten to twelve inches, and the milk allowed to run into vessels made of palm or other leaves, cocoanut shells or anything available for the purpose; it continues to flow for some time, but after flowing for ten minutes it gets very watery and thin. One plant will yield from five to ten catties of the coagulated caoutchouc. When raw, it has the appearance of sour milk, and to coagulate it the natives add salt or salt water. When freshly coagulated it is quite white, but gradually changes to a darker color. It retains its white color inside, and, upon cutting, it is found to be porous, the pores or cells containing water and salt, which have become enclosed during coagulation. In texture it is soft, very spongy and very wet. From January to November, 1877, fifty-seven picules forty-five catties of this rubber were exported from Klang alone. *Gutta-putih*, or *gutta-sundek*, is the produce of a species of *Dichopsis*, the leaves of which differ from those of *D. gutta* in being much shorter, broader and more ovate in general outline. The gutta is obtained and prepared in the same manner as gutta-taban, and trees are frequently met with on the Sayong and Meeru ranges. Of this variety 484 piculs 56 catties were exported from Klang alone from January to November, 1877. It is much whiter and more spongy than gutta-taban, and is worth only 15 dols. per picul as against 50 dols. for gutta-taban. In concluding this interesting report, Mr. Murton says: "When crossing the Meeru range from Kinta to Kwalla Kangsa, I cut off some leafy branches from a tree which had been felled and ringed a few days before. These leaves were beautifully yellow on the lower surface, caused by small peltate scales, and not pilose hairs, as in the *Isonandras* (*Dichopsis*); but, on making inquiries from men about Sayong, they pronounced them to be the foliage of some non-gutta yielding tree, which is certainly wrong, as I saw the dry gutta adhering to the bark where it had been ringed. A kind of gutta, called *gutta-jalutong*, is often used in Perak for mixing with guttas taban and putih, thus rendering them very brittle, but I have not seen the gutta nor the tree producing it. *Isonandra Motleyana* is said to yield a gum which, in Java and Sumatra, is known as *gutt-akolian*, and is used only for adulterating purposes. Various species of fig (*Ficus*) yield large quantities of milk, which in Perak is known as *gutta-burong*, as the only use to which it is put is for bird-catching."

From the foregoing remarks, it will be seen that there is a great deal yet to be learnt about the sources of those valuable plants and trees yielding elastic gums, and it is to be hoped that, with an extended knowledge of the plants themselves, increased supplies may also find their way into commerce.—*Jour. of Appl. Sci.*, Nov. 1.

MINUTES OF THE COLLEGE.

PHILADELPHIA, December 30th, 1878.

A stated meeting of the Philadelphia College of Pharmacy was held this day at the hall of the College. Dillwyn Parrish, President, in the chair; seventeen members present.

The minutes of the last stated meeting, and also those of the special meeting of November 22d, were read and on motion approved.

The Secretary of the Board of Trustees read the minutes of that body for the months of October, November and December, which were on motion adopted.

On motion of Thomas S. Wiegand an amendment to the by-laws of the College was proposed to Article XIII, Chapter VIII, which will make it read as follows: "All such persons as, from their knowledge of materia medica, chemistry, pharmacy and their collateral branches of science, shall, in the opinion of the College, merit that distinction, may be elected honorary or active members of the College."

The motion was accepted, and the subject laid over under the rules for action at the next stated meeting.

Charles Bullock, on behalf of the Committee on Deceased Members, reported the death of William Hodgson, Jr., a member of the College, which occurred on the 24th instant. He gave a short sketch of his life, and stated that the matter would claim the attention of the committee hereafter.

Mr. Bullock, on behalf of the same committee, read a memorial of the late Thomas H. Powers, which he stated had been prepared by the committee, with the assistance of Ambrose Smith, who was a fellow clerk with Mr. Powers when he was learning the drug business.

The memorial, which will be found on page 39, was listened to with much interest, covering as it does the many points of his useful and busy life from youth to age.

On motions of James T. Shinn and Thomas S. Wiegand, the memorial was accepted and ordered to be printed in the "Journal of Pharmacy," and that five hundred copies of the memorial be also printed for the use of the College.

Mr. Bakes moved that a copy be presented to each member of the class, which was adopted.

On motion of Mr. Shinn the thanks of the College were presented to the committee and Ambrose Smith for the very acceptable memorial which they had prepared.

Alonzo Robbins, on behalf of the delegation elected to attend the annual meeting of the American Pharmaceutical Association, made the following report:

To the Philadelphia College of Pharmacy:

The delegates appointed to attend the meeting of the Ameriean Pharmaceutical Association, at Atlanta, Ga., respectfully report that they attended to the duties assigned them.

Owing to the prevalence of yellow fever the meeting was postponed from the time originally fixed upon to the 26th of November, when, notwithstanding the lateness of the season, a very successful meeting was obtained.

The sessions were held in Concordia Hall; an address of welcome was delivered by the Hon. Mr. Angier, Mayor of the city of Atlanta, and a number of invitations to visit places of interest were received.

The hospitalities usually shown at the meetings of the Association were extended with undiminished force.

A number of useful and interesting papers were read, and a very important report from the Pharmacopœia Committee of the Association was presented.

The exhibition was not as large as usual, but was of considerable interest, notably the chemicals of Messrs. Powers & Weightman and Rosengarten & Sons, and the California plants shown by Mr. James G. Steele of San Francisco.

Gustavus J. Luhn, of Charleston, S. C., was elected president for the ensuing year, and fifty-eight new members were elected.

The Association adjourned on Friday morning, Nov. 29th, to meet at Indianapolis, Ind., on the second Tuesday of September, 1879.

After the adjournment most of the members returned immediately home, but quite a number embraced the opportunity of making a brief visit to Florida, receiving on the way the hospitality of the pharmacists of Macon, Ga.

Two of the delegates were unable to attend the meeting, and Mr. James T. Shinn, who was present, was added to the delegation.

Respectfully submitted,

ALONZO ROBBINS,
JAMES T. SHINN,
F. MARION MURRAY,
J. L. PATTERSON,
} Delegates in Attendance.

December 30th, 1878.

James T. Shinn entertained the meeting with an interesting description of a journey which was undertaken by a part of the delegation, under the guidance of Mr. Hunt, southward through Florida. Everything was done by those in charge to make the trip agreeable and instructive, and the delegation returned home with many pleasant recollections of the journey.

Prof. Maisch made a verbal report of the transactions of the Conference of Schools of Pharmacy, held in Atlanta Nov. 26th.

A letter from the Society of Pharmacy of Paris, directed to the President of the College, was read, conveying the thanks of the Society to the members of this College for the collection of American drugs sent to the Paris Exposition. The collection has been placed in the museum of the school in the Champ de Mars, where it can be advantageously consulted by the members of the Society.

On motion of Prof. Remington the letter was directed to be entered on the minutes.

There being no further business, then adjourned.

WILLIAM J. JENKS, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, December 7th, 1878.

Dillwyn Parrish, President, called the meeting to order; the minutes of the last meeting were read and approved.

Prof. Sadtler gave an account of some of the properties of the so-called California oil of turpentine, which was referred to in the minutes of the meeting for last month; in many particulars it coincides with, and in others it differs from, the characters referred to the *abietin* described by Prof. Wenzel, which is obtained from the Pinus Sabiniana. ("Amer. Jour. Phar." 1872, p 97.) The specific gravity of ordinary oil of turpentine is 0·86 to 0·88; of abietin 0·694; of oil examined 0·6974. The boiling point of ordinary oil is near 160°C.; of abietin, 101°C.; of oil examined 101 to 103°C. The optical rotatory power of English oil of turpentine is (a)=+18·6°; of French oil (a)=—35·4°; of Venetian oil (a)=—5·2; of templin oil (a)=—76·9; of abietin not ascertained; of oil of *Pinus ponderosa* (a)=—1·58°.

Mr. Gaillard called the attention of the meeting to the character of the residues

obtained by filtering the Schuylkill water: the animalculæ are readily discernible with a microscope of the power of 150 diameters; diatoms are easily recognized and after some weeks of observation a volvox was found yesterday. It shows the great necessity for filtering all water used in pharmaceutical dispensing. It was thought singular that the water supplied from the Schuykill now should be less fitted for pharmaceutic uses than that obtained twenty years ago; when it is remembered how many towns have grown up through that part of the State through which the Schuylkill and its tributaries pass, and the great manufacturing industries that have been developed this surprise will be seen to have no good foundation; it was genrally acceeded that reservoirs of subsidence should be provided that greater purity of water might be obtained.

The discussion that ensued called forth a notice that the College was supplied with apparatus by which such objects could be well displayed to all who desired to see them, and members were advised that with the microscopic attachment to the Zentmayer lantern the peculiar structure of different drugs was exhibited by Prof. Maisch in connection with his lectures.

A query whether any member present had made use of spun glass as a filtering medium was replied to in the affimative. The substance may be used for filtering acids and other corrosive liquids, and is made by Messrs. Whitall, Tatum & Co., glass manufacturers, of this city.

Prof. Maisch placed on the table the report of the regents of the Smithsonian Institution, as presented by their secretary to the College; he also called the attention of the members to the first three numbers of the "Chemist and Druggist," published in Victoria, Australia.

The Actuary called attention to the valuable collection of works already in the library relating to the subject of the cinchonas and their cultivation, and Prof. Maisch presented several volumes upon the same subject by Prof. Reichardt, by Prof. Flückiger and by Soubeiran and Delondre. On motion a vote of thanks was tendered to Prof. Maisch for his acceptable donation.

Prof. Maisch presented to the cabinet specimens of the Mexican soap root, which is the upright rhizome of a monocotyledonous plant and is used as a substitute for soap by the Mexicans; it was brought here by Mr. Fesquet who had traveled in Mexico, but was unable to ascertain its botanical origin.

Mr. Jacobs, through Prof. Maisch, presented specimens of China berries, the fruit of the Melia Azedarach, which grows freely in Virginia and further South, and is planted for its shade; the berries during the war of the rebellion were used as a source of whiskey.

The oil of asarum canadense was exhibited by Prof. Maiseh, who stated it was much used in perfumery, not so much for its own odor as for reinforcing the odor of other perfumes. It was made by Fritsche of New York; it was thought by some to resemble oil of rhodium, and by others oil of sandalwood Prof. Maisch exhibited specimens of the bark of *Rhamnus Purshiana*, which had been introduced under the fictitious name of *Cascara sagrado*, which name, according to Dr. Gibbons of San Francisco, is unknown on the Pacific coast, as is likewise the name of *Yerba Reuma*. The latter has a very salty taste and has been recognized as the *Frankenia*

grandifolia, nat. ord. Frankeniaceæ. Prof. Maisch stated that this order was related to the caryophyllaceæ, and it seems that only one plant belonging to it, *Beatsonia portulacæfolia*, Roxb, a native of Southwestern Africa, was at one time employed medicinally. Prof. Maisch also stated that *Berberis aquifolium* had been introduced as a medicinal agent. Out of twelve specimens received from different parts of the country only one proved to be the plant in question, the others were the *B. nervosa*. He expressed the belief that the species named as well as others belonging to the section *mahonia*, probably possess identical psoperties.

Prof. Maisch read a paper from Mr. L. Wolff on *oleic acid* and the use of benzin in its preparation. (See p. 8.) The proposed use of oleic acid for the isolation of alkaloids called forth some favorable comments.

The Librarian reported that the entire set of the "Paris Journal of Pharmacy," commencing, in 1809, with the "Bulletin de Pharmacie," for six years, then as "Journal de Pharmacie et de Sciences Accessoires," for 27 years, and since then continued as "Journal de Pharmacie et de Chimie," could now be consulted in the Library.

In answer to a question concerning the so-called *Unguentum petrolei*, a member stated that he had received prescriptions for it, and had found it a good material for making certain ointments, and that it would serve as a basis for ungt. hydrargyri oxidi rubri, keeping through the heat of summer without change. Prof. Sadtler said certain samples he had examined gave unmistakable signs of rancidity, but that if it were really a pure petroleum product, it was not liable to this objection.

The Actuary asked if any of the members had experimented with monobromated camphor in its relations to resins; that experiments he had made showed that it would not produce the pilular mass that ordinary camphor did. It was suggested to try whether artificial camphor resulting from the action of hydrochloric acid on turpentine would produce similar reactions.

There being no further business, a motion to adjourn was carried.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Alumni Association, Philadelphia College of Pharmacy. — The third social meeting of this season was held on Thursday, December 5th, at 3.30 P.M. In the absence of the regular officers, Dr. Miller was chosen to preside. There was an attendance of between thirty and forty.

After the reading of the minutes, Mr. Sayre read an instructive paper on Pill Excipients, and promised, at some future time, to continue the subject.

Dr. Miller suggested glucose as a good excipient, but few seemed to have tried it, except in the form of honey. It was stated that honey was frequently adulterated with glucose, and that terchloride of iron was the best test to detect it, as a black coloration was produced by the addition of the terchloride to honey diluted with glucose, but not to the pure article. (?)

Mr. Mattison read an essay on Sulphur Mining on the Pacific Coast, and showed a number of specimens.

Mr. Wiegand spoke of the advantages of cold cream when properly used, and thought it should be retained in the Pharmacopœia.

Mr. Vansint read a paper by Mr. G. W. Paine, on the same subject.

Mr. Gaillard read a paper on an Arsenical Test.

Dr. Murray showed some specimens of new drugs from California, and crystals of different salts, obtained from hydrastis.

Mr. J. B. Moore presented specimens of Goulard's Cerate, Fluid Extract of Wild Cherry and a substitute for lard.

After examination of specimens, on motion, adjourned.

Pharmaceutical Association of South Carolina.—The annual meeting was held in Charleston, on the evening of the 20th November, 1878. The following officers were elected to serve during the coming year:

President, E. S. Burnham; Vice Presidents—Dr. H. C. Guerin, H. E. Heinitsh; Secretary and Treasurer, Dr. E. H. Kellers; Board of Examiners at Charleston—A. W. Eckel, chairman, G. J. Luhn, A. W. Schwacke and C. O. Michaelis; Board of Examiners at Columbia—H. P. McGregor, chairman, E. E. Jackson, C. H. Miot and L. T. Silliman.

Dr. C. A. Tufts, of Dover, N. H., and Professor J. M. Maisch, of Philadelphia, were elected honorary members.

After the transaction of business, the members, with their invited guests, partook of a bountifully-supplied supper, spending the remainder of the evening in the enjoyment of social conversation and pleasant sentiments.

EDITORIAL DEPARTMENT.

The Semi-Centennial Anniversary of the Publication of the "American Journal of Pharmacy."—In April next it will be fifty years since the regular publication of this journal was commenced under the title of the *Journal of the Philadelphia College of Pharmacy*. Previous to that time, from 1825 to 1827, four numbers were published at irregular intervals under the supervision of a Publishing Committee, consisting of Dr. Samuel Jackson, Henry Troth, Solomon Temple, Ellis H. Yarnall and Daniel B. Smith. When the College determined upon the publication of the journal at regular stated periods, it was also agreed to commence the consecutive numbering of the volumes with the new issue, hence the four numbers previously published became known as the *preliminary volume*, and the one of which the present issue is the first number is the fifty-first of the regular series. In 1835 the title was changed to that of the *American Journal of Pharmacy*, and the publication continued as a quarterly until the close of the twenty-fourth volume in 1852. In the meantime the volume had been made to commence with the year, five numbers having been issued in 1847. With the twentieth volume (1848) the size of each number was increased to 96 pages, and with the twenty-fifth volume (1853) the journal was issued bi-monthly instead of quarterly, the size of each number remaining unchanged, except in 1864, during which year the numbers published contained only 80 pages each. With the forty third volume (1871) it had become necessary to issue the journal monthly instead of bi monthly, and the change

was accomplished without increasing the size of the volume by making the monthly numbers cover 48 pages each. At the same time the size of each page was widened and lengthened, which change, while it does not disturb uniformity with previous volumes in binding, yet added additional matter to each number equivalent to about seven pages or more. But even this increase in the text of the journal has been found insufficient at times, necessitating the additional increase in the size of a number from 48 to 64 pages, while at the same time most of the papers bearing on pharmacy and published in foreign journals are transferred to our pages in a condensed form as "Gleanings," "Selections," or "Varieties."

The different changes referred to are indicated on the title pages of the journal by "series," the first one comprising the six volumes published under the original title, and the second all the volumes issued in quarterly numbers under the present title. The third series, volumes xxv to xlii inclusive, embraces the bi-monthly publications, and with the change to monthly numbers in 1871 the fourth series was commenced.

Although the Journal is published by authority of the Philadelphia College of Pharmacy, the College is evidently not responsible for the views of the editor, nor is the latter responsible for the opinions held by the authors of contributed and selected papers, except in keeping the pages of the Journal unsullied from personalities and other unsuitable matter. But from the very commencement the College has annually appointed a Publishing Committee, whose members have assisted the editors with valuable advice and not unfrequently with original contributions. Of the first Publishing Committee, appointed about 54 years ago, the most active member, who contributed many valuable papers to the preliminary and the earlier volumes of the regular series, the venerable Daniel B. Smith is the only survivor, and being also one of the few surviving original members of the College, has ample reason to enjoy the prosperity and extended influence of the institution and the Journal, to the success of both of which his assiduous disinterested labors have materially contributed. The names of nearly all who served on the Publishing Committee are well known in American pharmacy, and several have exerted a well recognized and duly appreciated influence upon the elevation and progress of pharmacy in the United States. We refer more particularly to Drs. George B. Wood and Franklin Bache, and to William Procter, Jr., and Edward Parrish, all of whom have also labored in the College as professors, and of whom only Prof. Wood survives, honored by both the pharmaceutical and medical professions for his untiring and successful labors extending over half a century. In addition to those previously named, the following members of the College have served on the Publishing Committee: Chas. Ellis, S. P. Griffitts, Dr. Benjamin Ellis, Dr. Rob. Egglesfield Griffith, Dr Joseph Carson, Elias Durand, Wm. Hodgson, Jr., Jos. Scattergood, John C. Allen, Dillwyn Parrish, Dr. Rob. Bridges, Ambrose Smith, Augustine Duhamel, Wm. R. Fischer, Thos. P. James, Alfred B. Taylor, Jno. M. Maisch, Thos. S. Wiegand, Chas Bullock, James T. Shinn and Henry N. Rittenhouse.

During the fifty years of the uninterrupted publication of the Journal, the editorial chair has been occupied by Dr. B. Ellis from 1829 to 1833, Dr. R. E. Griffith from 1833 to 1836, Dr. Jos. Carson from 1836 to 1850, Wm. Procter, Jr., from 1850 to 1871, and since that time by the present incumbent. In addition to these Dr. Rob. Bridges served as assistant editor from 1839 to 1845, and Wm. Procter, Jr., in a like capacity from 1848 until he was elected editor.

The publication of the journal was commenced about simultaneously with the beginning elevation of pharmacy in the United States. Some years previous, in 1821, the Philadelphia College of Pharmacy had been organized, and lectures were instituted and continued to the present day. A few years afterwards the Massachusetts College of Pharmacy was organized in Boston, but lectures were not commenced until a more recent date. The New York College of Pharmacy followed in 1829, and at once entered the field as an educational institution. The other teaching Colleges of Pharmacy in the United States were all founded or reorganized

since the formation of the American Pharmaceutical Association in 1852, since which time also a number of State and more local pharmaceutical societies date their existence. Although attempts were made in some of the Southern States about 50 years ago, and in New York nearly 40 years ago, to regulate the practice of pharmacy by legislative measures, the pharmacy laws at present in force in about a dozen States have all been enacted within the last 10 years—since the subject has more prominently attracted the attention of the American Pharmaceutical Association.

The field of which 50 years ago the "American Journal of Pharmacy" was the sole occupant in the United States has been considerably extended since then, and is to some extent now cultivated by several other journals. The pharmacists who 50 years ago had no voice in the revision of the Pharmacopœia, now exert a very important influence in the periodical improvement of this national pharmaceutical law book. The educational advantages of which 50 years ago but few of the younger pharmacists could avail themselves, are now shared by a hundredfold the number. The pharmaceutical literature of North America which 50 years ago was in its infancy, and which, in fact, dates its birth with the beginning of the "American Journal of Pharmacy," is at present well known and duly appreciated throughout the civilized world.

In all these changes the Journal has not been merely a spectator, but has actively participated in bringing them about, so that its pages from the beginning form a faithful record of the rise and progress of pharmacy in the United States and abroad. Its aim will remain unchanged on entering the second half-century of its existence, and the editor, while he will continue to use his best endeavors in advancing what he conceives to be the true interests of our profession, urges upon the former contributors to continue, and upon the younger graduates and other members of the profession to commence recording their experience in the field of pharmacy and to offer them for the good of all. The editor earnestly bespeaks for the Journal a continuanee of the interest which has been so liberally extended to it before.

The Pennsylvania Patent Medicine Tax.—In a report on the meeting of the Pennsylvania Pharmaceutical Association at Reading, published on page 360 of our last volume, we stated that the Committee on Legislation was instructed to memorialize the Legislature for the repeal of the law imposing the tax mentioned. It was stated at the time that in some counties the tax was not collected, and that in fact there was no legal authority for collecting it. The matter in the meantime has been judicially decided, as will be seen from the following, which we copy from the Pittsburg Commercial Gazette of Nov. 26, 1878:

COMMON PLEAS NO. 2—JUDGES KIRKPATRICK AND EWING.—In eleven cases of appeals from aldermen, where the County Treasurer sought to collect additional mercantile license tax from druggists selling patent medicines, the judgments against defendants were reversed, the Court holding that the act of 1849, under which the tax claimed was assessed, had been repealed by act of 1858, and even if it had not been, there was no power under the act to collect the tax. The names of the defendants were J. B. Cherry, Emanuel & Maits, Joseph Abel, J. B. Hill, Mansfield Foster, Arnold Koch, Charles Schwarm, J. T. McKennan, A. F. Sandhill, G. R. Splane and Theodore Doerflinger.

Poisoning by Carbolic Acid.—Early in October last a boy, Helmuth Hartmann, of Milwaukee, was bitten by a dog, and Dr. Grættinger being called in soon afterwards saw the patient at 1 o'clock P. M., and prescribed a solution consisting of about nine parts of carbolic acid to one part of glycerin. The prescription contained no special directions, but before the Coroner the doctor testified that he gave verbal directions that a teaspoonful should be diluted with a pint of water, and in

this state applied to the wound by means of a cloth. The mother and a neighbor on the contrary testified that verbal directions for the application of the solution, but not for its previous dilution, were given. At 7 P. M., the boy became unconscious; later in the evening and during the night the doctor was sent for, but did not visit the patient until about 7 o'clock the next morning, when he met Dr. Schorse who had in the meantime been summoned. The patient died at 1 o'clock the same afternoon. The Coroner's jury returned the following verdict:

First—That Helmuth Hartmann came to his death through the excessive use of carbolic acid prescribed by Dr. Grættinger in treatment of a very slight wound inflicted by a dog.

Second—The jury in this case find that Dr. Grættinger committed a criminal offence in not writing directions for the use of the medicine prescribed by him, as he was well aware of the poisonous nature of the same, and in not responding to two successive calls during the night—not even when he was told that the patient was in a very dangerous condition.

Revoking a Physician's Certificate.—At the October term of the Cook Circuit Court, State of Illinois, an interesting decision was rendered by Hon. E. S. Williams, in a case which will probably be a precedent for similar cases also in other States, and, to a certain extent, seems to be also applicable to the pharmacy laws which have been recently enacted in several States.

A State Board of Health, consisting of seven persons appointed by the Governor, was created for the State of Illinois, by Act of May 29, 1877. The law contains the following sections:

"SEC. 10. The State Board of Health may refuse certificates to individuals guilty of unprofessional or dishonorable conduct, and they may revoke certificates for like causes." Section 13 provides for the punishment of any person practicing medicine or surgery in this State without complying with the provisions of the Act, except that it exempts from the operation of the law all persons who "have been practicing medicine ten years within this State."

The nature of the complaint in the case of Nathan J. Aikin *vs.* State Board of Health, and the remedy sought before the court, are explained in the following sentence, with which the learned judge opens his decision:

"This bill is filed by complainant, alleging that he is a duly licensed practicing physician in the city of Chicago; that he was regularly educated as a physician, graduated at the Cincinnati College of Medicine and Surgery in 1865; and that in July last a certificate was also issued to him by the State Board of Health as such physician, under the laws of the State of Illinois; that his practice is of great value to him; that while holding said certificate he has received from the State Board of Health a notice that said Board threatened to revoke his license; that the alleged cause of such revocation is the publication by complainant of divers professional notices in divers public newspapers, which notices are set out in full in complainant's bill; that the proposed action of the Board of Health originates from the fact of the publication of these printed notices by complainant, which conduct said Board alleges to be unprofessional and dishonorable, but which complainant claims is neither dishonorable nor unprofessional within the meaning of the statutes, and complainant denies the right of the State Board to revoke his license for any such cause, and prays for an injunction restraining such proposed action upon the part of the State Board of Health."

We have not the room to give even an abstract of the judge's review of the law, his legal explanations and the citing of analogous cases, by which he arrived at conclusions adverse to the complainant's argument and prayer; we merely give the concluding paragraph, which appears to us to be of more general importance than the remaining portion of his decision.

"Inasmuch as the right to practice medicine is a mere statutory privilege, subject to be changed at any time by the Legislature, and does not rise to the dignity of a contract or of property, there is no reason why such a privilege should not be denied to one man and extended to another in the discretion of the legislators. In this view, the objection to the law for want of uniformity in its application fails, and to this purport are the decisions of The People *vs.* Judge of 12th District, 17 California, 547, and Cohen *vs.* Wright, 22 California, 321, and other cases.

"The prayer for injunction will therefore be denied."

Gallate of Atropia.—A correspondent in Texas has asked our opinion concerning the possibility of combining gallic acid with atropia to a saline compound. From the few experiments which we have made, we believe that such a compound may be obtained, though we have as yet not obtained it in an uniformly crystalline condition. Both articles are slightly soluble in water, but freely soluble in alcohol. Gallic acid is a tribasic acid, having a molecular weight = 188. The molecular weight of atropia is 289. To form a neutral salt, one part of the former would require rather more than 4·6 parts of the alkaloid. The combination is best effected in alcoholic solution. But even if a salt of definite composition could be readily obtained, we doubt its superiority over other soluble salts of atropia, since the amount of gallic acid in a medicinal dose of its atropia salt would be too minute for exerting any characteristic influence.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Yearbook of Pharmacy, comprising abstracts of papers relating to Pharmacy, Materia Medica and Chemistry contributed to British and foreign journals from July 1, 1877, to June 30, 1878, with the Transactions of the British Pharmaceutical Conference at the Fifteenth Annual Meeting, held in Dublin August, 1878. London: J. & A. Churchill, 1878. 8vo, pp. 627.

The year-book occupies the first 390 pages of this volume, the remaining pages being occupied by the lists of members, the minutes, officers' reports, papers read and discussions at the meeting. A report of the meeting will be found on page 504 of the October number, and several of the papers read have since been published in the Journal. The typographical execution and the general appearance of the book is in the usual good style which we have been accustomed to see in the previous volumes. On page 385 we notice that credit is given for a paper by Mr. H. Betz on Sapo viridis, to the *Petersb. Med. Wochenschr.*, 1877, No. 20, while, we believe, that the original appeared in this journal February, 1878.

Medicinal Plants; being descriptions with original figures of the principal plants employed in medicine and an account of their properties and uses. By Robert Bentley, F.L.S., and Henry Trimen, M.B., F.L.S. Philadelphia: Lindsay & Blakiston, 1878. 4to. Price per part, $2.00

Parts 33 and 34 of this handsome and useful work now before us contain the following plants: Allium sativum, *Lin.*; Citrullus colocynthis, *Schrader*; Citrus medica, *Risso*; Citrus vulgaris, *Risso*; Coffea arabica, *Lin.*; Dorema ammoniacum, *Don*; Gossypium barbadense, *Lin.*; Prunus serotina, *Ehrh.*; Saccharum officinarum, *Lin.*; Salix alba, *Lin*; Statice caroliniana, *Walter*; Taraxacum officinale, *Wiggers*; Ulmus campestris, *Lin.*; Ulmus fulva, *Mich.* Most of the plants figured and described in these two parts are either indigenous or cultivated in the United States, and both the plates and letter press are as excellently executed as in the preceding parts.

Report of the Commissioner of Agriculture for the year 1877. Washington: Government Printing-office, 1878. 8vo, pp. 592.

This volume contains the report of the Commissioner, supplemented by the reports of the chiefs of the various subdivisions and by a number of papers on different agricultural subjects, among which the following may be mentioned as being of more or less direct interest to the pharmacist and druggist: *Maize and sorghum as sugar plants*; *the Chinese tea-plant*, giving an account of the cultivation and preparation of tea and of the growth of the plant in the United States, embellished with 11 plates; *the olive*, advocating the more extended culture of the tree, and furnishing some information from South Carolina, Florida and California, where the olive is cultivated to some extent; *the orange*, with accounts of its culture in Alabama, Florida and California, and other interesting facts concerning its culture and consumption, and *cranberry culture in New Jersey*.

OBITUARY.

T. CURTIS C. HUGHES, Ph.G., died in October, having attained the age of 52 years. He learned the apothecary business with John Klett & Co., of Philadelphia, and graduated at the Philadelphia College of Pharmacy in 1847. Shortly afterwards he commenced business in Pottsville, where he has been located ever since. The deceased enjoyed a good reputation in his county for professional attainment and uprightness. His thesis on "Uva ursi" was published in the 19th volume of this journal, p. 88.

CATALOGUE
OF THE
Class of the Philadelphia College of Pharmacy,
For the Fifty-eighth Session, 1878-79.
WITH A LIST OF THEIR PRECEPTORS AND LOCALITIES.

JUNIOR.

Matriculants.	*Town or County.*	*State.*	*Preceptor.*
Agthe, John Fred'k Oscar.	Salem,	N. C.	Wm. Simpson.
Armstrong, William Engalls,	Philadelphia,	Pa.	T. M. Perot & Co.
Atkinson, Edgar Harrington,	Dover,	Del.	David F. Burton.
Ballantine, Chas. Hamilton,	Philadelphia,	Pa.	E. Jos. Davidson.
Barrington, Richard Calcott,	Mt. Holly,	N. J.	Louis Miller
Bennett, Alex. Elwell,	Mt. Holly,	N. J.	Geo. M. Snowden.
Behringer, Albert Christian,	Philadelphia,	Pa.	Russell & Newburg.
Beringer, George Mahlon,	Philadelphia,	Pa.	Bullock & Crenshaw.
Boysen, Edward George,	Buffalo,	N. Y.	Dr. O Boysen.
Boysen, Lewis Colloredo,	Buffalo,	N. Y.	Dr. O. Boysen.
Brakeley, Philip Fine Howell,	Bordentown,	N. J.	Lancaster Thomas.
Brooks, Mitchell Baxter,	Philadelphia,	Pa.	C. P. Elfreth.
Brown, Chauncey Dewey,	Cadiz,	O.	W. J. Myers.
Campbell, Samuel, Jr.,	Philadelphia,	Pa.	Samuel Campbell.
Carl, Charles Blair	Greencastle,	Pa.	Adam Carl.
Cashmann, Nathaniel Alex.	Philadelphia,	Pa.	James T. Shinn.
Clark, Harry Scott,	Lancaster county,	Pa.	Chas. H. Clark.
Clark, Robert Jr.,	Philadelphia,	Pa.	E. Jos. Davidson.
Clymer, Chas. Wesley,	Philadelphia,	Pa.	Barker, Moore & Mein.
Collier, Louis Clay,	Kenton,	O.	Luther B. Tyson.
Collins, Thomas.		N. J.	Benj. Carter.
Colton, George Haven,	Springfield,	Mass.	H. & I. Brewer.
Courtney, Samuel Walter,	Philadelphia,	Pa.	John R. Augney.
Crichton, Jas. Alexander,	Richmond,	Va.	John Wyeth & Bro.
Croasdale, Jos. Wifred,	Philadelphia,	Pa.	Stackhouse & Buckman.
Crouse, James Norton,	Philadelphia,	Pa.	J. F. Zoellin.
Cowperthwait, Milton,	Camden,	N. J.	George D. Borton.

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Dahis, George Emil,	Philadelphia,	Pa.	Dr. C. W. Karsner.
Daley, Watson,	Orange C. H.	Va.	Isaac Tull.
Daniels, Adam Clarion,	Lyken,	Pa.	Alfred G. Stanley.
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Davis, Chas. Sumner,	Philadelphia,	Pa.	McKeown, Bower, Ellis & Co.
Davis, Frank Clifford,	Philadelphia,	Pa.	Robert Shoemaker & Co.
Detzer, August Jacob,	Fort Wayne,	Ind.	Detzer & Bro.
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Davis, Walton Elliott,	Shiloh,	N. J.	Dr. Titsworth.
Elder Horace,	Bloomington,	Ill.	Dr. Wm. A. Elder.
Elkins, Charles William,	Philadelphia,	Pa.	Lewis F Segrest.
Evans, George Bryan,	Colmar,	Pa.	George I. McKelway.
Famous, P. H.	Conshohocken,	Pa.	H. G. J. Hallowell.
Fisher, George Washington.	Catawissa,	Pa.	Dr. Thomas Hunter.
Freeman, Oliver John,	Allentown,	Pa.	James Van Buskirk.
Fry, Daniel Joshua,	Vineland,	N. J.	Samuel Gerhard.
Furey, Thomas May,	Philadelphia,	Pa.	Wm. R. Warner & Co.
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Galbreath, Thomas Mullin,	Dublin,	Md.	H. C. Blair's Sons.
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Goldsmith. George Washington,	Philadelphia,	Pa.	Wm. Weber.
Gosling, Thomas Richard,	Germantown,	Pa.	C. E. Davis.
Grimes, Robert Thomas,	Jeffersonville,	Pa.	Jos. P. Bolton.
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Hamilton, Naudain,	Harrisburg,	Pa.	John Wyeth & Bro.
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Hay, Harry Allen,	York,	Pa.	Hamilton Hutchison.
Hayes. George Washington,	Philadelphia,	Pa.	Keasbey & Mattison.
Hertsch, Bernhard August,	Saxony,	Germany.	J. W. Dallam & Co.
Higbee, Charles E.	Cleveland,	O.	Chas. Shivers.
Hodgson, Francis,	Penn Yan,	N. Y.	G. W. Davis & Son.
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Holland, Henry,	Philadelphia,	Pa.	
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Krell, Fred'k Bethazer,	Mahanoy City,	Pa.	W. A. Cantrell.
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Lascheid, Peter Wm.	Pittsburg,	Pa.	Urben & Co.
Latin, George,	Dayton,	O.	Sachs & Pruden.
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Lewis. Arthur E.	Scranton,	Pa.	John Wyeth & Bro.
Loos, Fred'k, Jr.	Philadelphia,	Pa.	John Wieland.
Love, John Henry,	Philadelphia,	Pa.	Hance Bros. & White.
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Maier, John,	Bridesburg,	Pa.	Dr. J. K. Knorr.
Maits. John Will,	Pittsburg.	Pa.	Emanuel & Maits.
Marshall, Rush Porter,	Princess Anne,	Md.	G. A Sanborn.
Matthias, Joseph Ingles,	Philadelphia,	Pa.	Barker, Moore & Mein.
May, Harry Wm. Daniel,	Egg Harbor,	N. J.	Dr. Theo's H. Boysen.
Maywood, Fenton,	Davenport,	Ia.	F. Wait.
Miller. Samuel Warn.	Marietta,	Pa.	H. Gampbell.

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Miller, Wm. Moses,	Bridgeton,	N. J.	H. A. Jorden.
Wilby, Arthur Robinson,	Frederica,	Del.	Dr. B. Whiteley.
Muhlenberg. Henry Melchior,	Philadelphia,	Pa.	
Muldoon, Edward Joseph,	Philadelphia,	Pa.	Dr. Roger Keys.
Myers, Charles Wm.	New Oxford,	Pa.	P. P. Fox.
O'Daniel, Andrew Alison,	Oxford,	Pa.	George Cooke.
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Ogram, Thomas Edwin,	Media.	Pa.	George I. McKelway.
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Owen, Horace Hildebrand,	York,	Pa.	Isaac H. Kay.
Paxson. Oric Henry, Jr.	Atglen,	Pa.	James A. Parker.
Peters, Henry Eugene,	Allentown,	Pa.	L. W. Adams.
Pettit, Louis Clark,	New Lisbon,	O.	King & Young.
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Rinck, Charles Adam,	Easton,	Pa.	Drs. Moyer & Richie.
Rehfuss, Emil Gustav,	Philadelphia,	Pa.	Alex. R. Lawson.
Reuting, Theo. Wm.	Titusville,	Pa.	E. K. Thompson.
Reynolds, John Brewster,	Philadelphia,	Pa.	Dr. Harrison Duffield.
Robins, Howard George,	Chester,	Pa.	Mortimer H. Bickley.
Ross, George Redseeker,	Lebanon,	Pa.	Dr. George Ross.
Rottner, August Albert,	Philadelphia,	Pa.	Dr. A. W. Miller.
Sandt, Joseph Peter,	Easton,	Pa.	D. E. Becker.
Saylor, Albert,	Allentown,	Pa.	C. C. Hughes.
Seiberlich. Albert,	Philadelphia,	Pa.	Dr. Charles G. Frowert.
Shaw, Allen,	Quakertown,	Pa.	Dr. R. J. Linderman.
Shelly. Jacob,	Mechanicsburg,	Pa.	John Wyeth & Bro.
Sherk, Harry Huber,	Lebanon,	Pa.	Dr. J. A. Armstrong.
Short, Wm. Hurtley,	Ardmore.	Pa.	S. F. Stadelman.
Shull, Silas Henry,	Mansfield,	O.	B. M. Magill
Smith, Wm. Clay.	Ottumwa,	Ia.	Samuel T. Jones.
Sombart, John Edward,	Booneville,	Mo.	E. Roeschel.
Speakman, Wm. Elwood,	Woodbury,	N. J.	Bullock & Crenshaw.
Stathem, Beach J.		N. J.	G. J. Kilbride.
Stamp, James Edward,	Wilmington,	Del.	John I. Gallagher & Bro.
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Stevenson, Charles Reeves,	Haddonfield,	N. J.	Dr. J. R. Stevenson.
Stout, Charles Pettit,	Florence Heights,	N. J.	Leidy Seipel.
Stuckert, Hermon Houpt,	Allentown,	Pa.	J. H. Allen, Jr.
Swayne, Walter Scott,	Philadelphia,	Pa.	Jones & Shaw.
Simes, Washington Lane,	Philadelphia,	Pa.	W. F. Simes & Son.
Tag, Wm.	Philadelphia,	Pa.	L. P. Reimann.
Thornley, Wm. James,	Norristown,	Pa.	Wm. Stahler.
Toplis, Wm. George,	Germantown,	Pa.	Wm. Conner.
Turley, George Stuart,	Haddonfield,	N. J.	F. M. Tilton.
Turner, Francis Samuel,	Doylestown,	Pa.	French, Richards & Co.
Tuttle, Wm. Channing,	Albion,	Mich.	A. W. Silsbee.
Van Allen. Herman,	Ionia,	Mich.	George Gundrum.
Wallis, John Edward,	Philadelphia,	Pa.	Dr. Wallis.
Warner, Frank Stephen,	Newark,	O.	Gilbert Bulform.
Whitaker, Daniel Kelsay,	Newport,	N. J.	L. H. Streets.
Wilgus, Wm. Alcott,	Bordentown,	N. J.	J. Frank Wilgus.
Willever, Stephen Arnold Douglas,	Bethlehem,	Pa.	A. J. Odenwelder.
Williams, Charles Henry,	Philadelphia,	Pa.	John S. Ward.
Williams, George Eli,	Elmira,	N. Y.	Alonzo Robbins.
White, Addison,	Mt. Vernon,	O.	Baker Bros.
Winebrenner, George Byron,	Frederick,	Md.	Wm. S. Bell.
Yeakle, John,	Norristown,	Pa.	Atwood Yeakle.
Young, Preston Reuben,	Bethlehem,	Pa.	M. J. Hess & Bro.
Young, Thomas Clemson,	Parkersburg,	Pa.	
Zaun, Henry,	Philadelphia,	Pa.	W. W. Moorhead.
Zimmerman, Mason Woodward,	Philadelphia,	Pa.	P. Hiskey.

SENIOR.

Aaron, James Polk,	Hollidaysburg,	Pa.	Frank H. West (dec'd).
Alleman, Emanuel Allison,	Milton,	Pa.	Wm. C. Bakes.
Allen, Alex. Bonnell,	Flemington,	N. J.	W. D. Robinson.
Allen, John Reese,	Wilmington,	Del.	James Kemble.
Ancker, Louis,	Charleston,	S. C.	George W. Notson.
Ashmead, Alfred Croskey,	Philadelphia,	Pa.	A. L. Helmbold.
Bancroft, George Hickman,	Philadelphia,	Pa.	R. W. Cuthbert.
Barnes, Thomas, Jr.	Philadelphia,	Pa.	Asa Jones.
Beale, Charles,	Philadelphia,	Pa.	Edmond Seale, M.D.
Beitenman, Wm. Wallace,	Reading,	Pa.	J. H. Stein.
Belleville, Allen Leslie,	Delaware City,	Del.	A. W. Test.

Matriculants.	*Town or County.*	*State.*	*Preceptor.*
Bellous, Charles Edward,	Bridgeton,	N. J.	Dr. Wm. Notson.
Beyer John Jacob,	Philadelphia,	Pa.	Vogelbach, Bros.
Bicker, Francis Joseph,	Philadelphia,	Pa.	Wm. B. Bicker.
Blankenhorn, John,	Poughkeepsie,	N. Y.	Wood & Tittamer.
Brakeley, Joseph,	Bordentown,	N. J.	Lancaster Thomas.
Bullock, John Griscom,	Wilmington,	Del.	Bullock & Crenshaw.
Castleton, Edw. Ligou Eroders,	Houston,	Texas,	R. Cotter.
Carpenter, Fred. White,	Poughkeesie,	N. Y.	Wood & Tittamer.
Caterson, Wm. Henry,	Philadelphia,	Pa.	Dr. Wm. M. Caterson.
Clapham, Hesser Charles,	Mifflinburg,	Pa.	John A. Milliac.
Cochran, Alfred W.	Camden,	N. J.	S. W. Cochran.
Costelo, David,	Indianapolis,	Ind.	George F. Traub.
Cox, Harry Oscar,	Gloucester,	N. J.	Dr. Duncan W. Blake.
Cravens, Harry Otis,	Dallas,	Texas.	S. S. Bunting.
Curran, John Prescott, Jr.	Philadelphia,	Pa.	A. Hohl.
Crawford, Walter,	Nazareth,	Pa.	R. F. Babp.
Day, Wm. George,	Hillsborough,	Md.	George I. McKelway.
Deacon, George Frank,	Bordentown,	N. J.	Bunting Hankins.
Diehl, Benj. Harper,	Quakertown,	Pa.	Harry Fisher.
Dinges, Robert Pitcairn,	Lock Haven,	Pa.	W. H. Hickman.
Drake, Theodore,	Bethlehem,	N. J.	Dr. Willard Wright.
Driver, Joseph Benjamin,	Darlington,	Wis.	James Hillis.
Eckels, George Morris,	Mechanicsburg,	Pa.	Alfred B. Wenrich.
Eyler, Maurice Edgar,	Waynesboro,	Pa.	Dr. J. B. Amberson.
Eyre, Clarence Preston,	Woodbury,	N. J.	John Wyeth & Bro.
Fahnestock, Levi,	Pittsburgh,	Pa.	B. L. Fahnestock & Co.
Flowers, Hiland,	Gettysburgh,	Pa.	A. D. Buehler & Co.
Forbes, Wm. Henry,	Indianapolis,	Ind.	Dr. John Smith Forbes.
Freas, Wm. Kerr,	Norristown,	Pa.	Wm. Stahler.
Frederick, John Henry,	Allentown,	Pa.	Wm. C. Bakes.
Frey, Andrew G.	Mountville,	Pa.	D. G. E. Husselman.
Frûh, Earnest,	Philadelphia,	Pa.	Carl D. S. Frûh.
Garcia. Amador de Jesus,	Santiago de Cuba,	Cuba,	A. J. Shick.
Gerhard, Wm. Henry,	Philadelphia,	Pa.	Robert Shoemaker & Co.
Graham, James Lord,	Camden,	Del.	S D. Marshall.
Griffin, Edwin Clarence,	Niles,	Mich.	Emmor H. Lee.
Hallam, Daniel,	Gloucester,	N. J.	Thomas Hallam.
Hallowell, James Alex.		Cal.	O. E. Hutchings.
Hammer, Edw. Howard,	Cleveland,	O.	Daniel S. Jones.
Harmanson, John Henry,	Pungoteague,	Va.	Wm. Procter, Jr., Co.
Hano, Simon Louis,	Philadelphia,	Pa.	H. B. Lippincott.
Haring, Henry Gettman,	Quakertown,	Pa.	John E. Grove.
Harker, Frank Scott,	Baltimore,	Md.	C. N. Wills.
Harrold, Charles Albert,	Washington,	D. C.	F. Brown.
Hart, George Franklin,	Williamsport,	Pa.	Louis Dembinski.
Henry, George Wm.	Camden,	N. J.	George D. Blomer.
Higgins, Charles Austin,	Flemington,	N. J.	H. Higgins.
Hoell, Conrad Gabriel,	Camden,	N. J.	Dr. T. G. Rowand.
Hoguet, Wm.	Bristol,	Pa.	Louis A. Hoguet.
Hudson. Leonard Adkins,	Milford,	Del.	E. E Hazlett.
Hull, Morris Albert,	Manayunk,	Pa.	S. W. Brown.
Humrich, Wm. Beetem,	Carlisle,	Pa.	H. C. Blair's Sons & Co.
Jacobs, Joe,	Athens,	Ga.	R. T. Brumby & Co.
Jones, Roland Davis,	Milton,	Del.	C. B. Lowe.
Jungman, Emil,	Heidelberg,	Germany.	C. C. Spannagel.
Kain, Wm. Wilkins,,	Camden,	N. J.	Herman W. Miller.
Kays, Loren Dewey,	Scranton,	Pa.	John Wyeth & Bro.
Klein, James Pecor,	Philadelphia,	Pa.	Jones & Shaw.
Kelly, Patrick Mulcahy,	Philadelphia,	Pa.	
Kelly, Robert,	Philadelphia,	Pa.	Mellor & Rittenhouse.
Kemble, Robert Hayes,	Mifflinburg,	Pa.	L. A. Dix.
King, George Henry,	Belvidere,	N. J.	A. G. Smith.
Koch, Emil,	Philadelphia,	Pa.	Louis Koch.
Kohlerman, John Wm.	Wilmington,	Del.	Dr. A. Nebeker.
Krogman, Joseph Francis,	Philadelphia,	Pa.	Benj. Falkenberg.
Lawall, Harry Clarence,	Catasauqua,	Pa.	Jacob S. Lawall.
Levi, Alex. Benj.	Philadelphia,	Pa.	C. C. Hughes.
Lins, John Allen,	Philadelphia,	Pa.	F. P. Lins.
Llewelyn, John,	Johnstown,	Pa.	Peter Paul Fox.
Lock. John Herman,	Philadelphia,	Pa.	Dr. Hildebrand.
Longaker, Daniel,	Schwenksville,	Pa.	V. H. Smith & Co.
McComas, Charles Edgar,	Hagerstown,	Md.	James G. Wells.
McCullough, Clement Brook,	Oxford,	Pa.	Madison Lovett.
McFadden, Eugene Anson,	Hollidaysburg,	Pa.	S. C. Snyder & Son.
McFeeters, Andrew James,	Philadelphia,	Pa.	Wm. R. Warner & Co
McKinley, Wm. Samuel Morrison,		Ireland.	
Mangold, Gustav Adolphus,	Trenton,	N. J.	

Matriculants.	*Town or County.*	*State.*	*Preceptor.*
Matthews, Albert Hudson,	Bethel,	N. J.	Dr. W. L. Matthews.
Megill, Watson,	Owensboro,	Ky.	Dr. Henry Megill.
Menger, Edw. Fred'k,	Crete	Neb.	Alex. Kennedy.
Metherington, Thomas,	Philadelphia,	Pa,	Wetherill & Bros.
Millington, Joseph Thomas,	St. Clair,	Pa.	A B. Wenrich.
Mitchell, Jacob Myers, Jr.	Salem,	N. J.	James B. McElroy.
Mittelbach, Wm.	Booneville,	Mo.	E. Roeschel.
Moffatt, Walter Ely,	Perrysville,	Ind.	Dr. T. C. Van Huys.
Moffet, David.	Philadelphia,	Pa.	John Moffet.
Moser, John Hendricks,	Norristown,	Pa.	A. R. Slemmer.
Murray, Bayard,	Philadelphia,	Pa.	Robert Shoemaker & Co.
Ott, Emile.	Philadelphia,	Pa.	L Wolff.
Paris, Edgar Price,	Germantown,	Pa.	Charles A Daniel.
Patterson, Wm. Renick,	Hillsboro,	O.	Chas. Shivers.
Payne, George Alex. Woodson,	Lynchburg,	Va.	Lumsden & Hamner.
Pechin, Wm. Joseph,	Philadelphia,	Pa.	Francis C. Clemson.
Pennypacker, Nathan,	Chester,	Pa.	Warrington & Trimble.
Peters, Horatio Gates,	New Oxford,	Pa.	Dr. T. V. S. Quigley.
Pleibel, Charles Fred. Will., Jr.	Philadelphia,	Pa.	Dr. Fred. Pleibel.
Plumer. Wm. S., Jr.	Columbia,	S. C.	C. A. Rutherford.
Raab. Ernst Philip,	Belleville,	Ill.	Dr. A. W. Miller.
Radley. Aaron Wm.	Easton,	Pa.	E. B. Garrigues & Co.
Rapp, Fred,	Mt. Carroll,	Ill.	H. A. Borell.
Reed, Eugene Lewis,	Atlantic City,	N. J.	E. S. Reed.
Reed, Willoughby Henry,	Phœnixville,	Pa.	I. M. Buckwalter.
Reeve, Walter Sharpless,	Medford,	N. J.	H. P. Thorn.
Reichard, Charles Wolff,	Wilkesbarre.	Pa.	John Wyeth & Bro.
Resag, Charles Edward,		Germany,	E. McInall, Wilmington.
Richards, Alfred Nathan,	Easton,	Pa.	Dr. J. A. C. Hanly.
Roberts, Charles Haines.	Woodbury,	N. J.	Joseph W. Merritt.
Roberts, Charles Henry B.	Philadelphia,	Pa.	I. R. Landis.
Roberts, Victor Christopher,	Salem,	N. J.	L. M. Bullock.
Ross, Augustus Harvey,	Camden,	N. J.	Dr. J. S. Everton.
Rudolph, John Mason,	Philadelphia,	Pa.	Dr. Wm. Hargreaves.
Rush, Warren Blachley,	Washington county,	Pa.	W. S. Throckmorton, M.D.
Schandein, Harry,	Philadelphia,	Pa.	Charles L. Mitchell.
Schimminger, George Wm.	Philadelphia,	Pa.	J. W Dallam & Co.
Siglinger, Charles Jacob,	Philadelphia,	Pa.	H. H. Godschalt.
Simpson, Moses S.	Dayton,	O.	Thomas Dover.
Slough, Charles Edward,	Allentown,	Pa.	C. K. Christman & Co.
Smedley, Harry Leedom,	Media,	Pa.	Jones & Shaw.
Smeltzer, Jacob Daniel,	Croskill Mills,	Pa.	F. G. Thomas.
Smith, Augustus Swartz,	South Bethlehem,	Pa.	Val. H. Smith & Co.
Smith, Henry George,	Allentown,	Pa.	Jos. B. Shaw, M.D.
Sparks, Alfred Denny,	Smyrna, [nut Hill,	Del.	S. P. Wright.
Speaker, George Sylvester,	Philadelphia, Chest-	Pa.	Wm. A. Whittem.
Sprissler, Theodore,	Philadelphia,	Pa.	B. Falkenberg.
Stark, Albert August Gustav,	Danville,	Ill.	J. N. Marks.
Sterner, Oliver Henry,	Allentown,	Pa.	Wm. H. Rinker.
Stites, Albert Harvey,	Millerstown,	Pa.	J. P. Thatcher.
Stock, Jacob Frederick,	Woodbury,	N. J.	Aug. P. Blomer, M.D.
Strunk, Samuel Wm.	Quakertown,	Pa.	Stephen F. Penrose.
Talbot, Stephen Liversidge,	Boston,	Mass.	Jos. P. Remington.
Thayer, Edward Monroe,	Philadelphia,	Pa.	J. W. Simpers.
Thomas, Emil Conrad,	Philadelphia,	Pa.	Hugo Oppermann.
Thorp, Alex. Proudfit,	Rocky Mt.	N. C.	J. T. Weaver.
Troll, Conrad Wm.	St. Clairsville,	O.	J. Bartley Hoge.
Turner, Alexander,	Philadelphia,	Pa.	W. L. Turner.
Turner, Curtis Waugh,	Philadelphia,	Pa.	F. S. Boisnot.
Turner, John Basketter,	Philadelphia,	Pa,	R. R. Stewart.
Uhland, John Augustus,	Lebanon,	Pa.	Dr. George Ross & Co.
Vansant, Robert Hays,	Trenton,	N. J.	Henry B. Chumar.
Wade, McClanahan,	Christianshurg,	Va.	J. E Waddell & Co.
Wagener, Charles Hugh,	Lawrenceville,	N. J.	Fred. C. Qrth.
Wallington, Edward Morrell,	Trenton,	N. J.	Randal Rickey.
Watson, Charles Wesley,	Cochranville,	Pa.	Dr. L M. Pratt.
Wendel, Wm.	Frankfort,	Germany,	C. H. Risk.
Wessels, John Louis,	Bremen,	Germany,	John G. Baker.
Whiteside, Wm, Elder,	Philadelphia,	Pa.	P. S. P. Whiteside.
Whitney, Henry Clay,	Glassboro,	N. J.	C. H. Kolp.
Williams, Fred. Tyacke,	Philadelphia,	Pa.	H H Rose.
Wlliams, Wm. Chapman,	Havre de Grace,	Md.	W. F. Roche.
Wilson, Wm. Rufus,	Philadelphia,	Pa.	Dr C. W. Seary.
Witsil, George Edward,	Philadelphia,	Pa.	Barker, Moore & Mein.
Woodnutt, Wm. Warren,	Salem,	N. J.	Bullock & Crenshaw.
Zaegel, Max Robert,	Sheboygan,	Wis.	J. A Heintzelman.
Zeller, Charles Frederick,	Philadelphia,	Pa.	Jos. P. Remington.